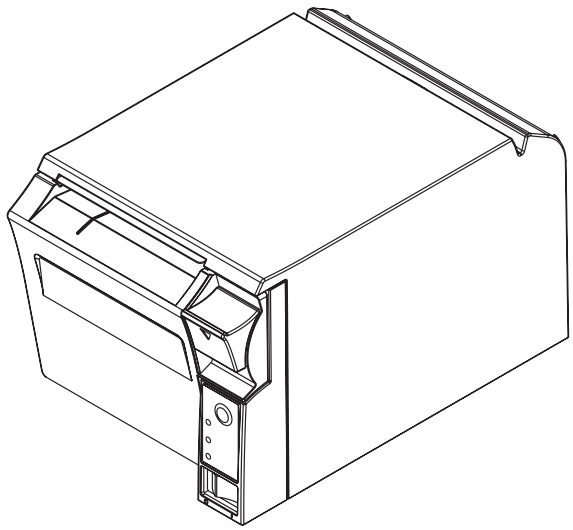
TM-T70

Technical Reference Guide



Product Overview

Describes features and general specifications for the product.

Setup

Describes setup and installation of the product and peripherals.

Application Development Information

Describes how to control the printer and necessary information when you develop applications.

Handling

Describes how to handle the product.

Appendix

Describes interfaces, connectors and character code tables.

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Rev. C

Cautions

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ESC/POS® Command System

EPSON has been taking industry's initiatives with its own POS printer command system (ESC/POS). ESC/POS has a large number of commands including patented ones. Its high scalability enables users to build versatile POS systems. The system is compatible with all types of EPSON POS printers (excluding the TM-C100) and displays. Moreover, its flexibility makes it easy to upgrade the future. The functionality and the user-friendliness is valued around the world.

Revision History

Revision	page	Details of change
Rev. A	All pages	Newly authorized
Rev. B	All page	All descriptions
Rev. C	page 42	Standalone connection added for the USB interface connection diagram.
	page 46, page 56, page 65	UB-R03 added.

For Safety

Key to Symbols

The symbols in this manual are identified by their level of importance, as defined below. Read the following carefully before handling the product.

WARNING	You must follow warnings carefully to avoid serious bodily injury.
CAUTION	Provides information that must be observed to prevent damage to the equipment or loss of data. • Possibility of sustaining physical injuries. • Possibility of causing physical damage. • Possibility of causing information loss.
CAUTION	Provides information that must be observed to avoid damage to your equipment or a malfunction.
NOTE	Provides important information and useful tips.

Warnings

WARNING

- To avoid risk of electric shock, do not set up this product or handle cables during a thunderstorm
- **Never insert or disconnect the power plug with wet hands.**
  Doing so may result in severe shock.
- **Handle the power cable with care.**
  Improper handling may lead to fire or electric shock.
  * Do not modify or attempt to repair the cable.
  * Do not place any heavy object on top of the cable.
  * Avoid excessive bending, twisting, and pulling.
  * Do not place the cable near heating equipment.
  * Check that the plug is clean before plugging it in.
  * Be sure to push the plug all the way in.
- **Be sure to use the specified power source.**
  Connection to an improper power source may cause fire or shock.
- **Do not place multiple loads on the power outlet.**
  Overloading the outlet may lead to fire.
- **Shut down your equipment immediately if it produces smoke, a strange odor, or unusual noise**.
  Continued use may lead to fire. Immediately unplug the equipment and contact your dealer or a Seiko Epson service center for advice.
- **Never attempt to repair this product yourself.**
  Improper repair work can be dangerous.
- **Never disassemble or modify this product.**
  Tampering with this product may result in injury or fire.
- **Do not allow foreign matter to fall into the equipment.**
  Penetration by foreign objects may lead to fire.
- **If water or other liquid spills into this equipment, do not continue to use it.**
  Continued use may lead to fire. Unplug the power cord immediately and contact your dealer or a Seiko Epson service center for advice.
- **If you open the DIP switch cover, be sure to close the cover and tighten the screw after adjusting the DIP switch.**
  Using this product with the cover open may cause fire or electric shock.

Cautions

CAUTION

- **Do not connect cables in ways other than those mentioned in this manual.**
  Different connections may cause equipment damage or fire.
- **Be sure to set this equipment on a firm, stable, horizontal surface.**
  The product may break or cause injury if it falls.
- **Do not use this product in locations subject to high humidity or dust levels.**
  Excessive humidity and dust may cause equipment damage or fire.
- **Do not place heavy objects on top of this product. Never stand or lean on this product.**
  Equipment may fall or collapse, causing breakage and possible injury.
- **To avoid injury, do not insert fingers or any part of the hand in the roll paper opening where the manual cutter is installed.**
- **Do not open the roll paper cover without taking the necessary precautions, as this can result in injury from the autocutter fixed blade.**
- **Do not use aerosol sprayers containing flammable gas inside or around this product.**
  Doing so may cause fire.
- **To ensure safety, unplug this product before leaving it unused for an extended period.**

Restriction of Use

When this product is used for applications requiring high reliability/safety such as transportation devices related to aviation, rail, marine, automotive etc.; disaster prevention devices; various safety devices etc.; or functional/precision devices etc., you should use this product only after giving consideration to including fail-safes and redundancies into your design to maintain safety and total system reliability. Because this product was not intended for use in applications requiring extremely high reliability/safety such as aerospace equipment, main communication equipment, nuclear power control equipment, or medical equipment related to direct medical care etc., please make your own judgment on this product's suitability after a full evaluation.

About this Manual

Aim of the Manual

This manual was created to provide information on development, design, and installation of POS systems and development and design of printer applications for developers.

Manual Content

The manual is made up of the following sections:

Chapter 1	Product Overview
Chapter 2	Setup
Chapter 3	Application Development Information
Chapter 4	Handling
Appendix	Specifications of Interface and Connector Character Code Tables

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Product Overview

This chapter describes features and specifications of the product.

Features

The TM-T70 is a receipt printer with high speed printing and a small footprint. With its compact design, it can be placed in a narrow space, such as under a counter, and it also has full front access for easy operability.

High speed printing

- Issuing of batch receipts is possible.
- Maximum print speed: 170 mm/s
- Graphics are also printed with high-speed printing.

Front operation

- Easy drop-in paper loading
- Front access operation of the power button and operation panel
- Front access operation for receipt ejection

Software

- Command protocol is based on the ESC/POS® Proprietary Command System.
- OPOS ADK and Windows® printer driver are available.
- In addition to supporting several kinds of bar code printing, two-dimensional code (PDF417, QR code) printing is possible.
- Various layouts are possible by using page mode.
- A maintenance counter function is supported.

Interface

Various interface boards (EPSON UB series) can be used.

Product Configuration

Interface

- Serial interface model (RS-232C)
- Parallel interface model (IEEE1284)
- USB interface model (full-speed)
- Ethernet interface model (10/100BASE-T)
- Wireless LAN interface model (IEEE802.11b)

Buzzer

- Model with the buzzer function
- Model without the buzzer function

Color

- ECW (Epson Cool White)
- EDG (Epson Dark Gray)

Accessories

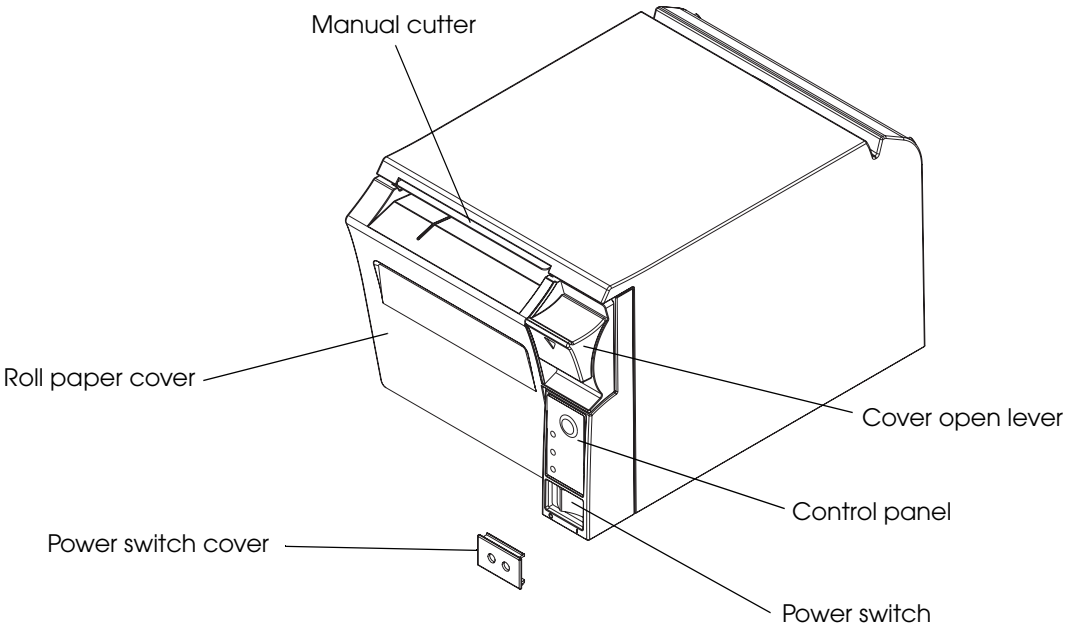
Attachments

- Roll paper (for operation check)
- User's manual
- Power switch cover
- Locking wire saddle (only for USB interface model)

Options

- External power supply (Model: PS-180)
- Connector cover (Model: OT-CC70W/OT-CC70B)
  Protects cables and interface connected to the printer.
- Affixing tapes for fixing the printer (Model: DF-10)
- Interface boards (UB series)

Parts Name and Function



Power Switch

Turns the printer on or off. The marks on the switch: (⏻ / |)

CAUTION

Before turning on the printer, be sure to check that the AC adapter is connected to the power supply.

CAUTION

Before turning the printer off, it is recommended to send a power-off command to the printer. If you use the power-off sequence, the latest maintenance counter values are saved. (Maintenance counter values are usually saved every two minutes.)
For detailed information about ESC/POS commands, see the ESC/POS Application Programing Guide.

Power Switch Cover

Install the power switch cover that comes with the TM-T70 onto the printer to prevent inadvertent changing of the power switch, to prevent tampering, and to improve the appearance of the printer.

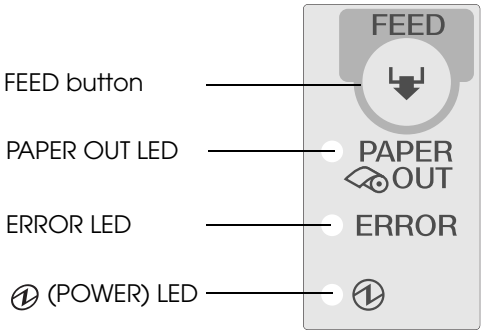
To reset the printer when the power switch cover is installed, insert a long, thin object (such as the end of a paper clip) into the hole in the power switch cover and press the power switch.

WARNING

If an accident occurs with the power switch cover attached, unplug the power cord immediately.

Continued use may cause fire or shock.

Control Panel



FEED button

Pressing this button once feeds the roll paper by one line. Holding this button down feeds the roll paper continuously.

LED

PAPER OUT LED

- Lights when there is no more roll paper or there is little remaining.
- Off when there is a sufficient amount of roll paper remaining.
- Flashes when a self-test is in progress.

ERROR LED

Lights or flashes when the printer is offline.

- Lights after the power is turned on or after a reset (offline). Automatically goes out after a while to indicate that the printer is ready.

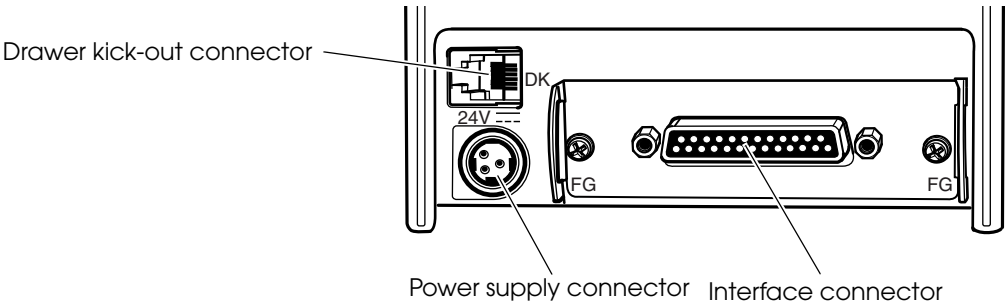
- Lights when the end of the roll paper is detected, and when printing has stopped (offline). If this happens, replace the roll paper.
- Flashes when an error occurs. (For details about the flash codes, see "Error Status" on page 16.)
- Goes out during regular operation (online).

POWER LED (green)

- Lights when the power supply is on.
- Goes out when the power supply is turned off.

Connectors

All cables are connected to the connector panel on the lower rear of the printer.



- Drawer kick-out connector: Connects the cash drawer.
- Power supply connector: Connects the power supply unit
- Interface connector: Connects the printer with the host computer interface.

CAUTION The picture above shows a serial interface model. For details on the various interfaces and how to connect the power supply connector and cash drawer, see "Connecting the Printer to the Host Computer" on page 39 and "Connecting the Cash Drawer" on page 48.

Offline

The printer automatically goes offline under the following conditions:

- During power on (including resetting with the interface) until the printer is ready
- During the self-test
- While roll paper is fed using the FEED button.
- When the printer stops printing due to a paper-end (if an empty paper supply is detected by the roll paper end sensor or if the driver has been set to stop printing when a roll paper near-end is detected)
- When an error has occurred

Error Status

There are three possible error types: automatically recoverable errors, recoverable errors, and unrecoverable errors.

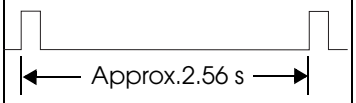
Automatically Recoverable Errors

Printing is no longer possible when automatically recoverable errors occur. They can be recovered easily, as described below.

Error	Error description	Error LED flash code	Recovery measure
Roll paper cover open error	The roll paper cover was opened during printing.		Recovers automatically when the roll paper cover is closed.
Print head temperature error	A high temperature outside the head drive operating range was detected.		Recovers automatically when the print head cools.

Recoverable Errors

Printing is no longer possible when recoverable errors occur. They can be recovered easily by turning the power on again or sending an error recovery command from the driver after eliminating the cause of the error.

Error	Error description	Error LED flash code	Recovery measure
Autocutter error	Autocutter does not work correctly.		Remove the jammed paper or foreign matter in the printer, close the roll paper cover, send the error recover command, or turn the power on to recover.

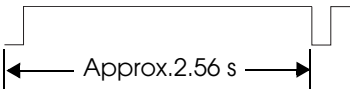
CAUTION The error recovery command is valid only if a recoverable error (excluding automatically recoverable errors) occurs.

Unrecoverable Errors

Printing is no longer possible when unrecoverable errors occur. The printer must be repaired.

CAUTION

Turn off the power immediately when unrecoverable errors occur.

Error	Error description	Error LED flash code (Approx. 160 ms)
Memory R/W error	After R/W checking, the printer does not work correctly.	
High voltage error	The power supply voltage is extremely high.	
Low voltage error	The power supply voltage is extremely low.	
CPU execution error	The CPU is executing an incorrect address.	
Internal circuit connection error	Internal circuits are not connected correctly.	
UIB error	An abnormal operation occurs in UIB.	

NV Memory (Non-Volatile Memory)

The printer has NV memory which includes the user NV memory and NV graphics memory that users can use.

> **CAUTION**
>
> NV memory can be rewritten about 100,000 times. As a guide, NV memory rewriting should be 10 times or less a day when you program applications.

User NV Memory

Characters can be stored in the user NV memory.

Use ESC/POS commands to write or read them.

> **NOTE**
>
> For detailed information about ESC/POS commands, see the ESC/POS Application Programing Guide.

NV Graphics Memory

Graphics such as shop logos to be printed on receipts can be stored. Even with a serial interface model whose communication speed is low, high speed graphic printing is possible.

Use the TM Flash Logo Setup utility for NVRAM to register graphics.

NV Graphics Print Mode

In this mode the printer prints the following:

- Capacity of the NV graphics
- Used amount of the NV graphics
- Unused capacity of the NV graphics
- Number of the NV graphics that are registered
- Key code, number of dots in X direction, number of dots in Y direction, number of colors to be defined.
- NV graphics data

Procedure

1. Open the roll paper cover.
2. While pressing the FEED button, turn the power on.
3. Press the FEED button once.
4. Close the roll paper cover.
5. After instructions are printed, open the roll paper cover.
6. Press the FEED button once.
7. Close the roll paper cover.

Turn the power off and on to return to the normal mode.

Product Specifications

Printing method		Thermal line printing
Cutting method		Partial cut (cutting with one point in left edge left uncut)
Roll paper (single-ply)		Width: 79.5 ± 0.5 mm (3.13 ± 0.02")
Interface		Serial (RS232C), Parallel (IEEE1284), LAN (10/100BASE-T), USB (Full-speed), Wireless LAN (IEEE802.11b)
Buffer	Receive buffer	4 KB/45 bytes (selectable using the DIP switch 1-2)
	Downloaded buffer	12 KB (both for user-defined characters and downloaded images)
	NV graphics data	256 KB
	NV user memory	1 KB
Barcode/two-dimensional code printing		UPC-A, UPC-E JAN 8 (EAN 8), JAN 13 (EAN 13) CODE 39 ITF CODABAR (NW-7) CODE 93 CODE 128 PDF417 QR CODE
DKD Function		2 drives
Supplied voltage		+ 24 VDC ± 7%
Life	Mechanism	15,000,000 lines
	Thermal head	100 million pulses
	Autocutter	1,5000,000 cuts
	MTBF	360,000 hours
	MCBF	52,000,000 lines
Temperature/humidity		Operating: 5 to 45°C {41 to 113°F}, 10 to 90% RH Storage: -10 to 50°C {14 to 122°F}, 10 to 90% RH
Overall dimensions		114 × 125 × 194 mm {4.49 × 4.92 × 7.64"} (H × W × D)
Weight (mass)		Approx. 1.8 kg {3.96 lb} (Roll paper excluded)

Printing Specifications

Printing method		Thermal line printing
Dot density		180 × 180 dpi
Printing direction		Unidirectional with friction feed (Reverse feed is not supported.)
Maximum printable width		72.2 mm, 512 dots
Character per line	Font A (12 × 24)	42
	Font B (9 × 17)	56
Maximum print speed*1	High speed mode	170 mm/s
	Low power consumption mode	150 mm/s
Line spacing		4.23 mm {1/6"} (Factory setting, programmable by command)

dpi: dots per inch

*1: when the printer prints with the default print density level at 24V and 25°C {77°F}.

NOTE

- Printing speed may be slower, depending on the such items as the data transmission speed.
- High speed mode/low power consumption mode can be shifted with a DIP switch (2-3/2-4).

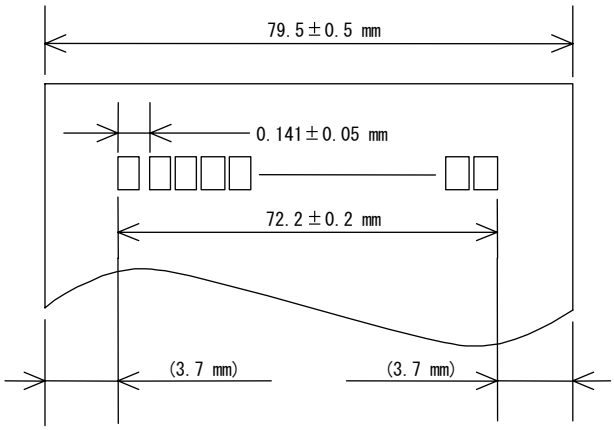
Character Specifications

Number of characters		Alphanumeric characters: 95 Extended graphics: 128 × 11 pages (including user-defined page) International characters: 48
Character structure		Font A (Initial setting): 12 × 24 (including 2-dot spacing in horizontal) Font B: 9 × 17 (including 2-dot spacing in horizontal)
Character size	Font A	Standard: 1.69 × 3.38 mm Double-height: 1.69 × 6.77 mm Double-width: 3.38 × 3.38 mm Double-width, double-height: 3.38 × 6.77 mm
	Font B	Standard: 1.69 × 3.38 mm Double-height: 1.69 × 6.77 mm Double-width: 3.38 × 3.38 mm Double-width, double-height: 3.38 × 6.77 mm

Note)

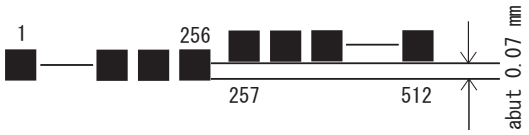
1. The actual print character may be smaller than the size shown in the table above, because the above size includes spaces in the font.
2. Characters can be scaled up to 64 times as large as the standard size.
3. Character size not including the horizontal spacing in the standard scale is as follows:
   Font A (12 × 24): 1.41 (W) × 3.384 (H) mm
   Font B (9 × 17): 0.987 (W) × 2.397 (H) mm

Printable Area



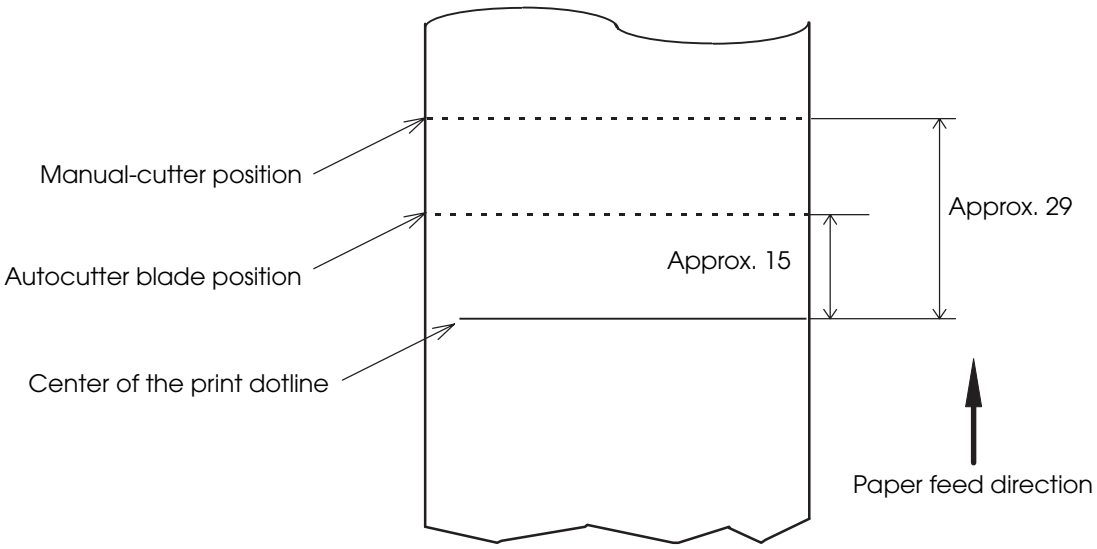
CAUTION

In 2-divided energizing, the print position within the printable area of the thermal elements for dots 1 to 256 and 257 to 512 is shifted approximately 0.07 mm {0.0028"} as shown in the figure below in the paper feed direction.



In 4-divided energizing, the print position within the printable area of the thermal elements for dots 1 to 96, 97 to 240, 241 to 368, and 369 to 512 is shifted approximately 0.04 mm {0.0016"} as shown in the figure below in the paper feed direction.

Printing and Cutting Positions



(units: mm (All the numeric values are typical.))

CAUTION The values above may vary slightly as a result of paper slack or variations in the paper. Take the notice into account when setting the cutting position of the autocutter.

Paper Specifications

Paper type		Specified thermal paper
Size	Roll paper diameter	83 mm {3.27"} maximum
	Roll paper spool	Inside: 12 mm {0.47"}, Outside: 18 mm {0.71"}
	Take-up roll paper width	80 + 0.5/-1.0 mm
	Paper width	79.5 ± 0.5 mm
Specified roll paper type		NTP080-80 In U.S.A.: Nakagawa Mfg. (USA) Inc. In Europe: Nakagawa Mfg. (Europe) GmbH In Southeast Asia: N.A.K. Mfg. (Malaysia) SDN BHD (Original paper: TF50KS-E Nippon Paper Industries Co., Ltd.Åj

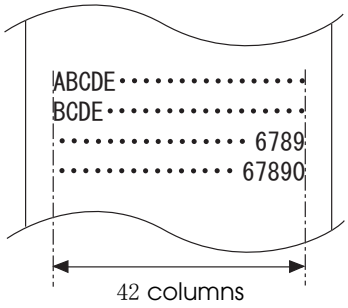
CAUTION

- Paper must not be pasted to the roll paper spool.
- The remaining amount of the roll paper when a roll paper near-end is detected differs depending on the spool type.

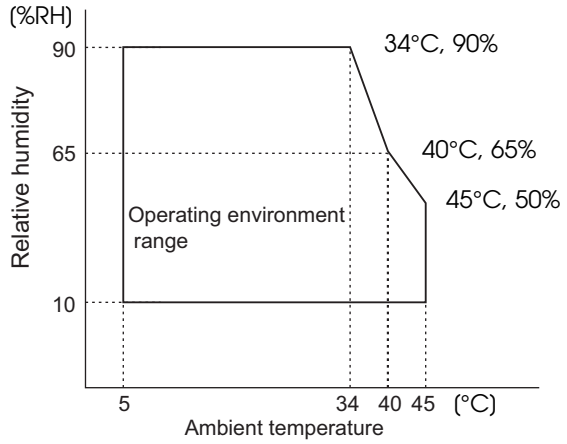
Electrical Characteristics

<table>
<tr><th colspan="2"></th><th>High speed mode</th><th>Low current consumption mode</th></tr>
<tr><td colspan="2">Supply voltage</td><td colspan="2">DC24V ± 7%</td></tr>
<tr><td rowspan="2">Current consumption
(at 24V, 25°C, normal print density)</td><td>Standby</td><td colspan="2">Mean: Approximately 0.1A
Maximum 1A for drawer kick-out driving.</td></tr>
<tr><td>Operating</td><td>Mean: Approximately 1.8A

Note) When print ratio is approximately 18%
• Font A
• 42 columns
• ASCII character continuous printing for 100 lines (repeats 20H-7FH)</td><td>Mean: Approximately 1.2A

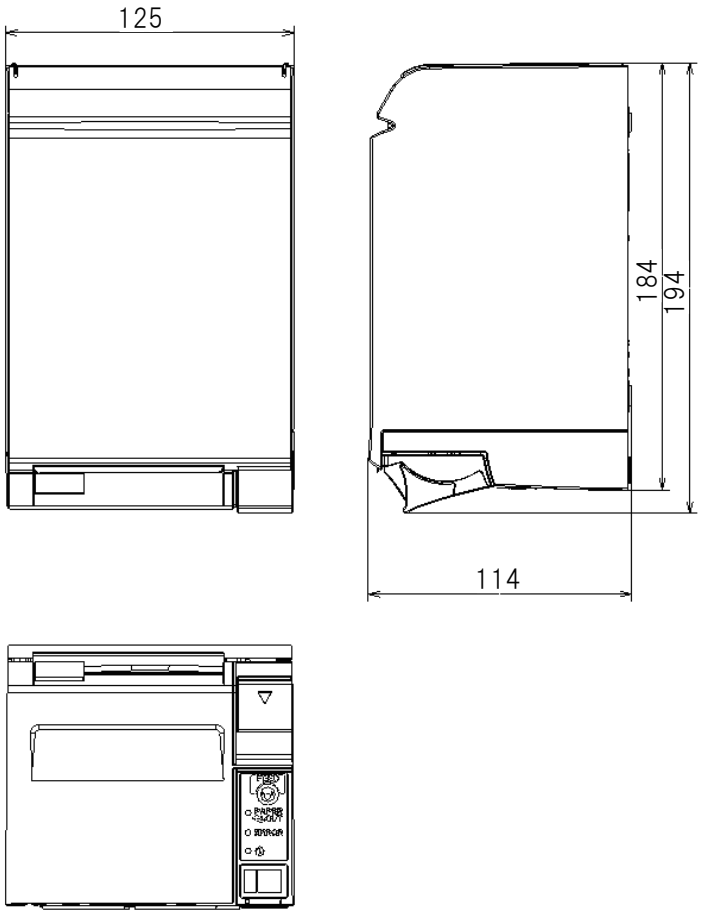
 
</td></tr>
</table>

Environmental Conditions

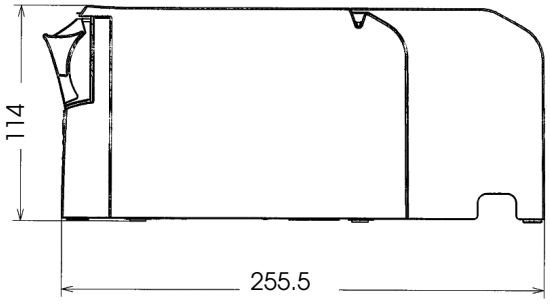
Temperature/ Humidity	Operating	5 to 45°C {41 to 113°F}, 10 to 90% RH (See the operating temperature and humidity range below.)
	Storage (Factory packing)	-10 to 50°C {14 to 122°F}, 10 to 90% RH (except for paper)
		
Acoustic noise (Operating)		Approximately 55 dB (Bystander position) Note) The values above are measured in the Epson evaluation condition. The acoustic noise differs depending on the paper used, printing contents, or the setting values such as print speed or print density.

External Dimensions and Mass

- Height: Approximately 114 mm {4.49"}
- Width: Approximately 125 mm {4.92"}
- Depth: Approximately 194 mm {7.64"}
- Mass: Approximately 1.8 kg {3.96 lb} (except for roll paper)



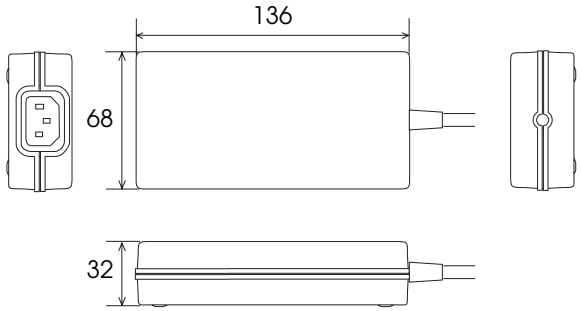
<When the Optional OT-CC70 is installed>



(Unit: mm)

Option Specifications

Power Supply Unit (PS-180)



(Unit: mm)

Electric characteristics	Input conditions	input voltage (rating): 90 to 264VAC (100VAC -10% to 230VAC +15%)
		Frequency (rating): 50/60 Hz ± 3 Hz
		Power consumption (rating): 100VA
	Output conditions	Output voltage (rating): 24VDC ± 5%
		Output current (rating): 2.0A
		Output electric power (rating): 48VA
		Output peak current: 4.5A
Case specifications	Dimensions (H × W × D)	68 × 136 × 32 mm {2.68 × 5.35 × 1.26"} (excluding projections)
	Weight	Approx. 0.4 kg {14.11 oz} (excluding the AC cable)
	Color	Black (matte)

Material

No specific brominated flame retardants, such as PBBE and PBB, are used in this product.

AC cable selection

Select an AC cable that satisfies the following conditions.

- Safety standard product
- Plug with PE terminal

Ground connections

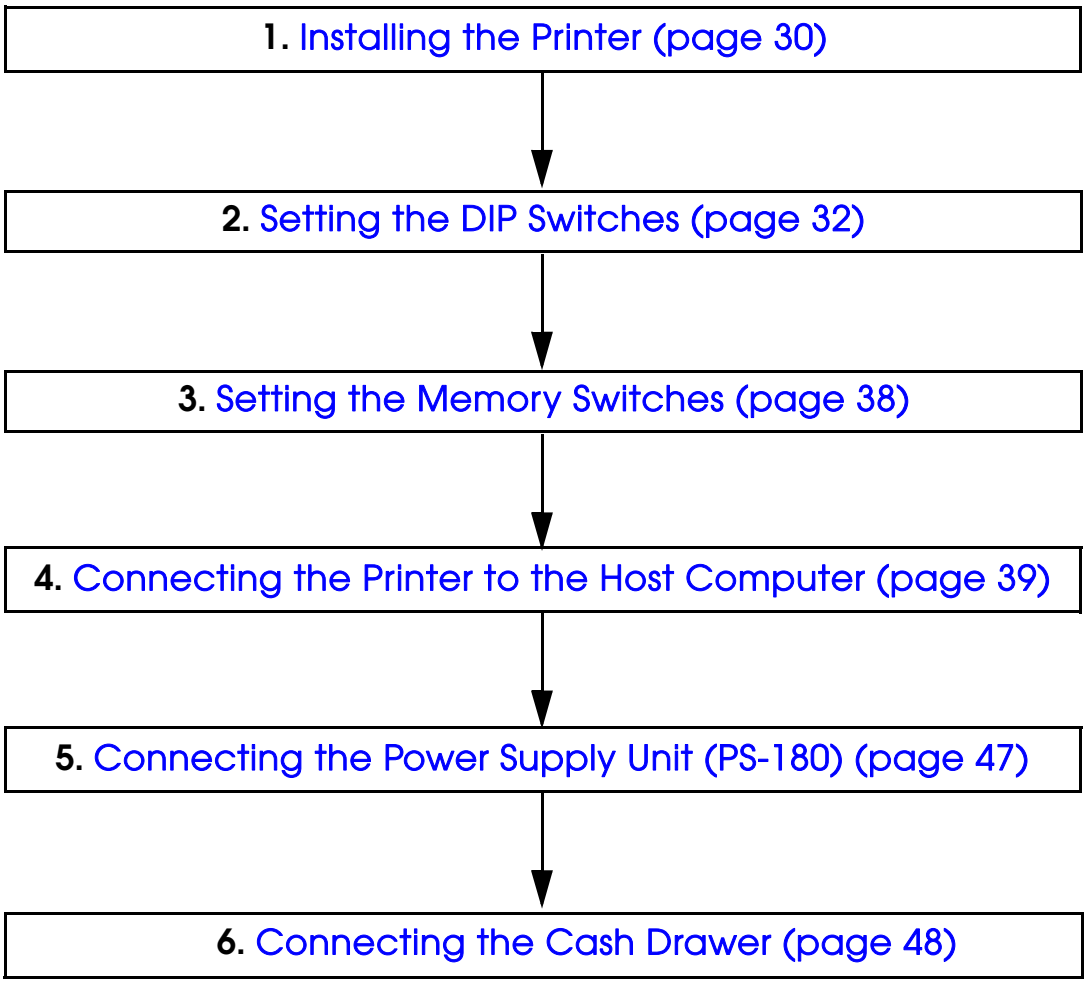
Be sure to ground for safety.

Setup

This chapter describes setup and installation of the product and peripherals.

Flow of Setup

This chapter consists of the following sections along with the setup flow of the product and peripherals.


1. Installing the Printer (page 30)
2. Setting the DIP Switches (page 32)
3. Setting the Memory Switches (page 38)
4. Connecting the Printer to the Host Computer (page 39)
5. Connecting the Power Supply Unit (PS-180) (page 47)
6. Connecting the Cash Drawer (page 48)

Installing the Printer

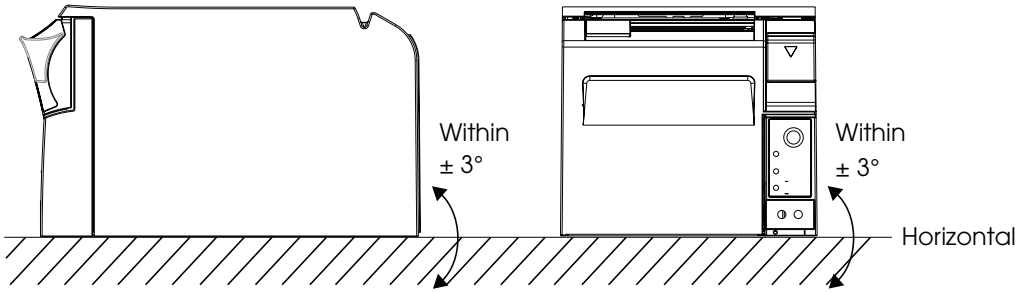
You can install this printer only horizontally.

Fix the printer so that it does not move around when you open the roll paper cover and cut roll paper. A tape for fixing the printer is available as an option. (See "Affixing Position of DF-10" on page 31.)

As shown in the figure below, install the printer with a maximum tilt of 3°.

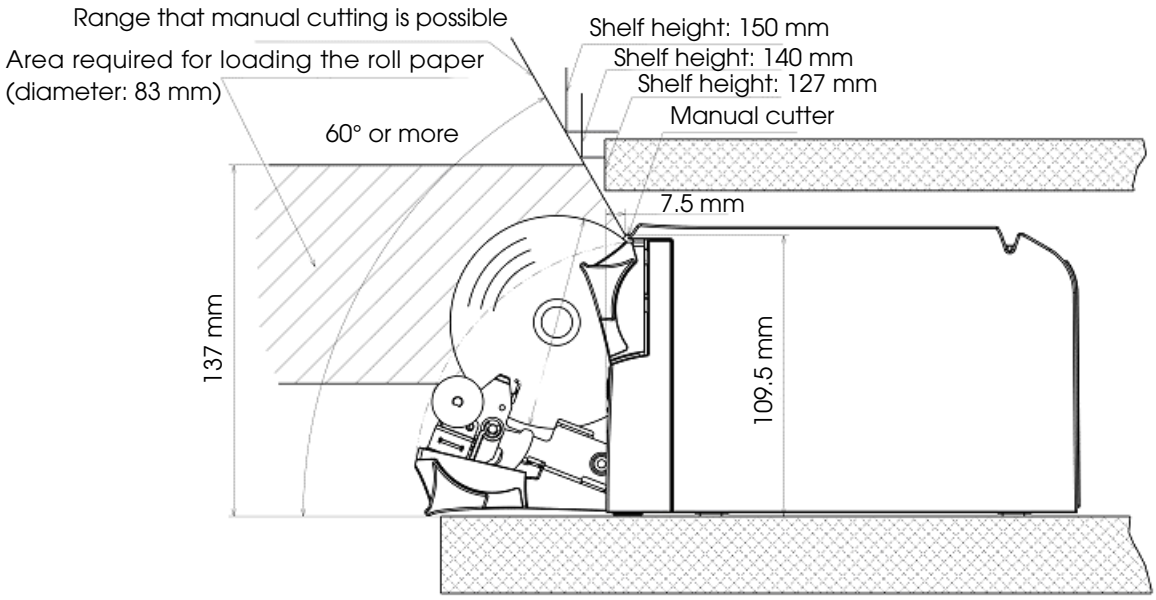
Installing the printer with a tilt of more than 3° may cause the following problems.

- Roll paper near end cannot be detected.
- The roll paper cover will not close after installing roll paper.
- Roll paper cannot be taken out.



If the printer installation does not fit within the specifications shown in the figure below, the following problems may occur.

- Cannot set the roll paper in the printer
- Cannot cut the paper with the manual cutter

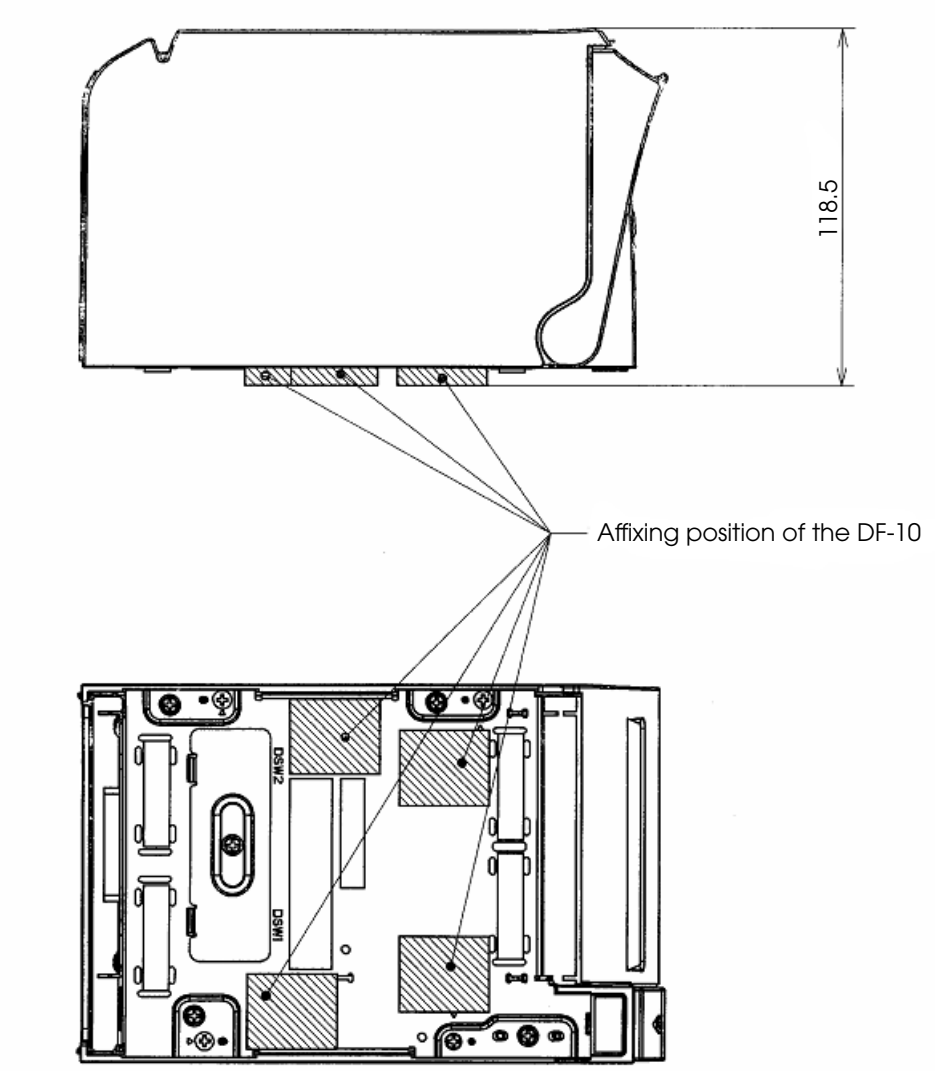


Important Notes on Installation

- The printer must be installed horizontally.
- Do not place the printer in dusty locations.
- Do not catch cables or foreign matter under the printer.
- Do not put anything that has a force of more than 32.7 N {3 kgf} on the top of the printer.

Affixing Position of DF-10

When you use the affixing tapes for fixing the printer (Model: DF-10), paste them as shown in the figure below.



Setting the DIP Switches

On this printer, you can make various settings with DIP switches.

> **NOTE** For models with the buzzer function, see also "Setting the Buzzer" on page 49.

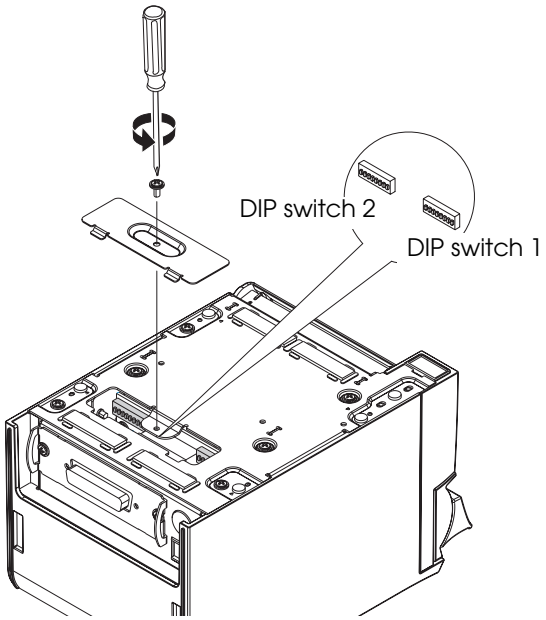
Setting Procedure

Follow the steps below to change the DIP switch settings.

> **CAUTION**
> **Before you remove the DIP switch cover, turn the printer off.**
> Otherwise, a short-circuit may cause the printer to malfunction.

> **CAUTION** DIP switch settings are enabled only when the power is turned on or the printer is reset via the interface. If the settings are changed after that, the functions will not change.

1. Make sure the power supply for the printer is turned off.
2. Unscrew the screw to remove the DIP switch cover from the base of the printer.



3. Set the DIP switches, using the tip of a tool, such as a small screwdriver.
4. Attach the DIP switch cover, and screw it in place.

For Serial Interface

DIP Switch Bank 1

SW	Function	ON	OFF	Factory setting
1-1	Data reception error	Ignored	Prints "?"	OFF
1-2	Receive buffer capacity	45 bytes	4 KB	OFF
1-3	Handshaking	XON/XOFF	DTR/DSR	OFF
1-4	Word length	7 bits	8 bits	OFF
1-5	Parity check	Yes	No	OFF
1-6	Parity selection	Even	Odd	OFF
1-7	Transmission speed selections	See the " Transmission speed (DIP switch 1-7/1-8)" table below.		ON
1-8				ON

Transmission speed (DIP switch 1-7/1-8)

Transmission speed (bps)	SW 1-7	SW 1-8
115200 (Initial value)	ON	ON
2400, 4800, 9600, 19200, 38400, 57600, 115200 (When setting with a command/Memory Switch Setting Utility)		
4800	OFF	ON
9600	ON	OFF
19200	OFF	OFF

bps: bits per second

CAUTION

- The transmission speed can be set with a command or the memory switch utility. (Setting values: 2400, 4800, 9600, 19200, 38400, 57600, 115200) The value set with a command or the memory switch utility is enabled only when DIP switches 1-7 and 1-8 are on. For other settings, the value set with the DIP switches is enabled.
- Depending on print conditions such as print duty, print head temperature, and data transmission speed, print speed is automatically adjusted, which can cause white lines due to intermittent print (the motor sometimes stops). To avoid this, set the transmission speed higher or keep the print speed constant by setting it lower. (See "Setting the Memory Switches" on page 38.)

DIP Switch Bank 2

SW	Function	ON	OFF	Factory setting
2-1	Handshaking (BUSY condition)	Receive buffer full	• Offline • Receive buffer full	OFF
2-2	Reserved (Do not change settings)	Fixed to OFF		OFF
2-3 ~ 2-4	Selects print density/Low power consumption mode	See "Selecting the Print Density (DIP Switch 2-3/2-4)" on page 36.		OFF
2-5	Reserved	—	—	OFF
2-6	Reserved (Do not change settings)	Fixed to OFF		OFF
2-7	I/F pin 6 reset signal	Enabled	Disabled	OFF
2-8	IF pin 25 reset signal	Enabled	Disabled	OFF

CAUTION

- For DIP switch 2-1 (BUSY condition), see also "Selecting the BUSY Status" on page 37.
- Do not change the setting of DIP switches 2-2 and 2-6. Otherwise, the printer may not operate normally.

For Interfaces Other Than Serial Interface

The following DIP switch functions are for the parallel/USB/LAN/wireless LAN interface.

DIP switch bank 1

SW	Function	ON	OFF	Factory setting
1-1	Auto line feed	Always enabled	Always disabled	OFF
1-2	Receive buffer capacity	45 bytes	4 KB	OFF
1-3	Reserved	—	—	OFF
1-4	Error signal output	7 bits	8 bits	OFF
1-5 ~ 1-8	Reserved	—	—	OFF

DIP switch bank 2

SW	Function	ON	OFF	Factory setting
2-1	Handshaking (BUSY condition)	Receive buffer full	• Offline • Receive buffer full	OFF
2-2	Reserved (Do not change settings)	Fixed to OFF		OFF
2-3 ~ 2-4	Selects print density/Low power consumption mode	See "Selecting the Print Density (DIP Switch 2-3/2-4)" on page 36.		OFF
2-5	Reserved	—	—	OFF
2-6 ~ 2-7	Reserved (Do not change settings)	Fixed to OFF		OFF
2-8	IF pin 31 reset signal (Do not change settings)	Fixed to ON		ON

CAUTION

- For DIP switch 2-1 (BUSY condition), see also "Selecting the BUSY Status" on page 37.
- Do not change the setting of DIP switches 2-2, 2-6, and 2-7. Otherwise, the printer may not operate normally.

Selecting the Print Density (DIP Switch 2-3/2-4)

Function	SW 2-3	SW2-4
Low power consumption mode	ON	ON
Print density (Standard)	OFF	OFF
Print density (Darker than standard)	ON	OFF
Print density (Dark)	OFF	ON

CAUTION

- If the print density is set to “Darker than standard” or ”Dark” level, printing speed may be reduced.
- The print density can be set with DIP switches (2-3/2-4) or the customized value. (See "Setting the Memory Switches" on page 38.) The initial setting of the customized value is “Depends on the DIP switch settings.” If the customized value is changed, the value set with the customized value is enabled.

Selecting the BUSY Status

With DIP switch 2-1, you can select conditions for invoking a BUSY state as either of the following:

- When the receive buffer is full
- When the receive buffer is full or the printer is offline

CAUTION In either case above, the printer enters the BUSY state after power is turned on (including resetting with the interface), and when a self-test is being run.

Printer BUSY condition and status of DIP switch 2-1

Printer status		DIP SW 2-1	
		ON	OFF
Offline	During the period after power is turned on (including resetting with the interface) to when the printer is ready to receive data.	BUSY	BUSY
	During the self-test.	BUSY	BUSY
	When the cover is open.	—	BUSY
	During paper feed with the FEED button.	—	BUSY
	When the printer stops printing due to a paper-end (when printer has run out of roll paper).	—	BUSY
	When an error has occurred.	—	BUSY
When an error has occurred.		BUSY	BUSY

CAUTION If DIP switch 2-1 is on, the printer will not become BUSY

- When error has occurred
- When the cover is open
- When printing has stopped for a paper out
- When paper is fed by the FEED button

Setting the Memory Switches

With the “memory switch (customized value”), which is a software switch of this printer, you can set:

- Print density
- Print speed
- Number of head energizing parts

Use the Memory Switch Setting Utility or a command to set the memory switches.

> **NOTE**
>
> - For detailed information about the memory switch utility, see the user’s manual for the Memory Switch Setting Utility.
> - For detailed information about ESC/POS commands, see the ESC/POS Application Programing Guide.

Selecting the print density

Selectable from levels 1 to 13 (light ~ dark).

> **CAUTION**
>
> The print density can be set with DIP switches (2-3/2-4) or the customized value. (See "Setting the Memory Switches" on page 38.) The initial setting of the customized value is “Depends on the DIP switch settings.” If the customized value is once changed, value set with the customized value is enabled.

Selecting the print speed

Selectable from levels 1 to 9 (low ~ high). (Initial setting: level 9)

> **CAUTION**
>
> Depending on print conditions such as print duty, print head temperature, or data transmission speed, print speed is automatically adjusted which may cause white lines due to intermittent print (the motor sometimes stops). To avoid this, keep the print speed constant by setting it lower, or set the transmission speed higher in case of the serial interface. (See "Transmission speed (DIP switch 1-7/1-8)" on page 33.)

Selecting the number of head energizing parts

- One-part energizing
- Two-part energizing
- Four-part energizing
- Auto energizing (Initial setting)

> **NOTE**
>
> Usually, the number of head energizing parts does not need to be changed.

Connecting the Printer to the Host Computer

CAUTION

- Be sure to install the driver before connecting the printer to the host computer.
- The printer uses the modular connectors specifically designed for the cash drawer. Do not connect these connectors to an ordinary telephone line.

For Serial Interface

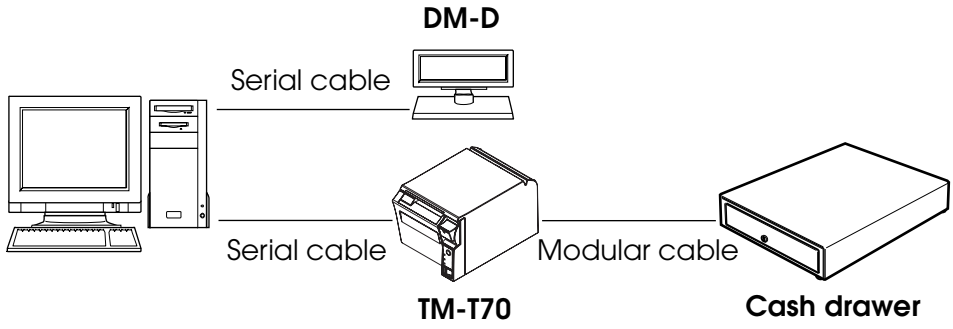
Serial interface connection diagram

When this printer is connected to the host computer by the serial interface, two connection forms are possible:

- Stand alone
- Pass-through connection

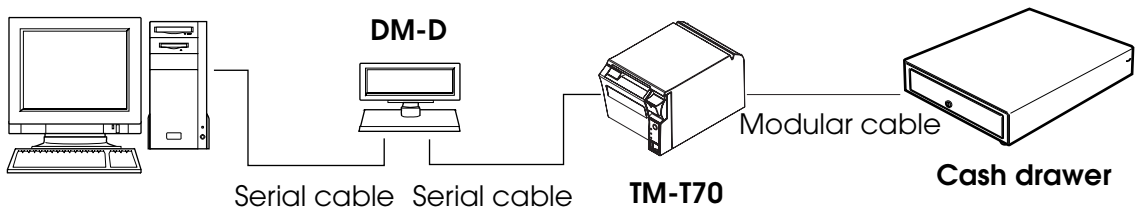
Stand alone

This printer is connected to the host computer via the serial port. When a customer display (DM-D) is to be connected, connect it to the host computer via the serial port.



Pass-through connection

This printer is connected to the host computer over the serial interface via a customer display (DM-D).



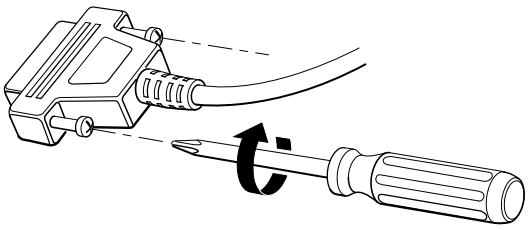
Connecting the serial interface (RS-232C) cable

WARNING

Be sure to turn off the power supply for both the printer and host computer before connecting the cables.

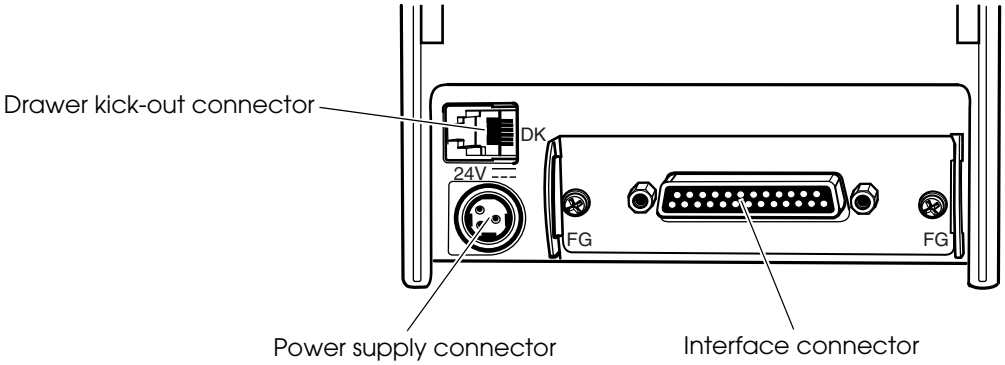
1. Insert the interface cable connector firmly into the interface connector on the connector panel.

2. When using connectors equipped with screws, tighten them to secure the connectors firmly.



3. When using interface cables equipped with a grounding line, attach the ground line to the screw hole marked "FG" on the printer.

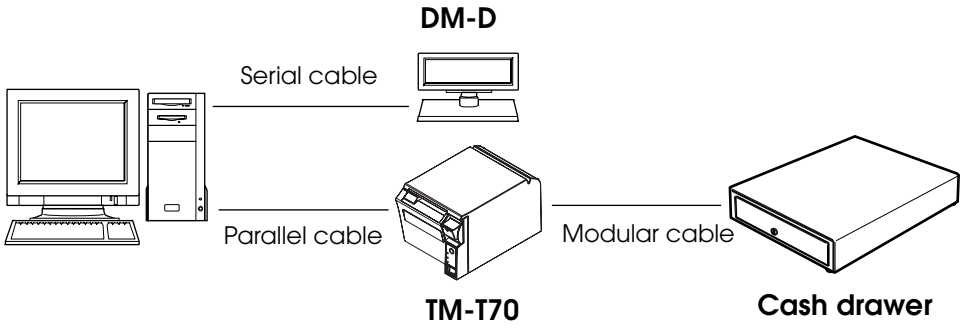
4. Connect the other end of the interface cable to the host computer.



For Parallel Interface

Parallel interface connection diagram

This printer is connected to the host computer via the parallel port. When a customer display (DM-D) is to be connected, connect it to the host computer via the serial port.



Connecting the parallel interface cable

1. Insert the interface cable connector firmly into the interface connector on the connector panel.
2. Press down the clips on either side of the connector to lock it in place.
3. When using interface cables equipped with a ground line, attach the ground line to the screw hole marked "FG" on the printer.
4. Connect the other end of the interface cable to the host computer.

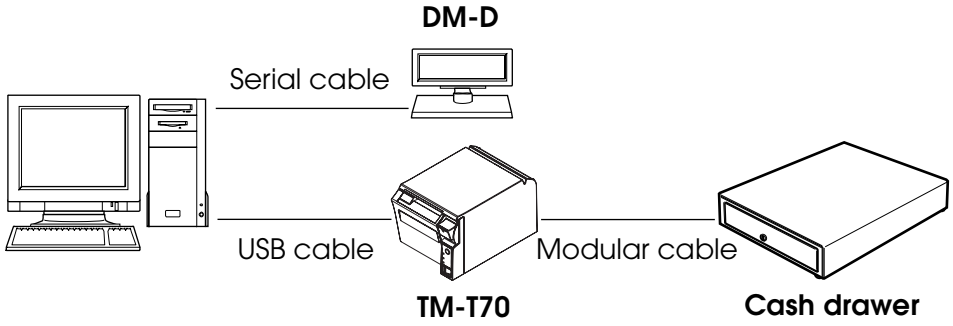
USB interface connection diagram

When this printer is connected to the host computer by the USB interface, two connection forms are possible:

- Stand alone
- Y connection

Stand alone

This printer is connected to the host computer via the USB port. When a customer display (DM-D) is to be connected, connect it to the host computer via the serial port.



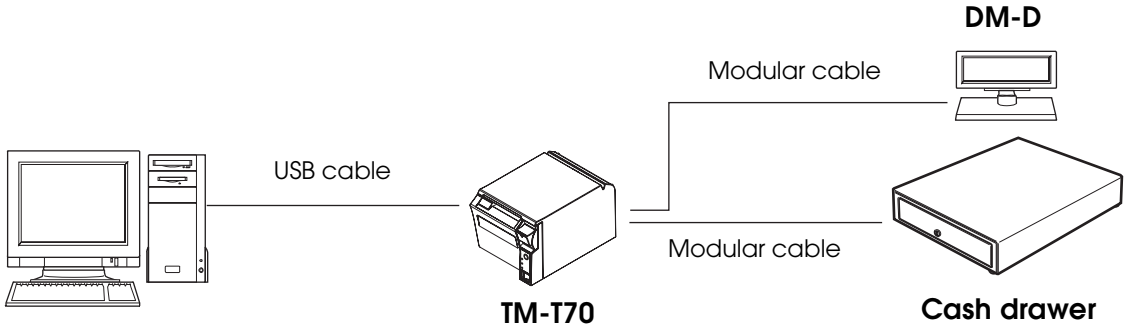
Y connection (only with the UB-U01III/U02III)

This printer is connected to the host computer via the USB port. When a customer display (DM-D) is to be connected, connect it to the printer via the modular cable.

CAUTION

When connecting a customer display to the printer, connect the modular jack from the customer display to the DM connector.
Also, set the communication conditions of the customer display as follows:

- Baud rate: 19200 bps
- Bit length: 8-bit
- Parity: no parity
- Stop bit: 1

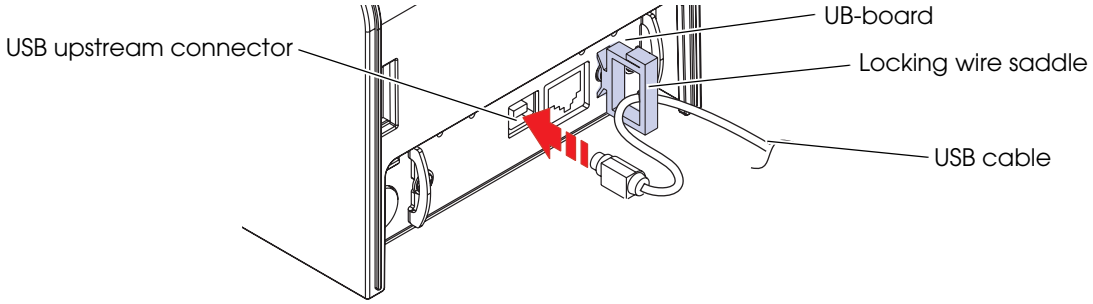


Connecting the USB interface cable

1 Attach the locking wire saddle at the location shown in the figure below.

2 Put the USB cable through the locking wire saddle.

> **CAUTION** Putting the USB cable through the locking wire saddle, as shown in the figure below, prevents the cable from coming unplugged.

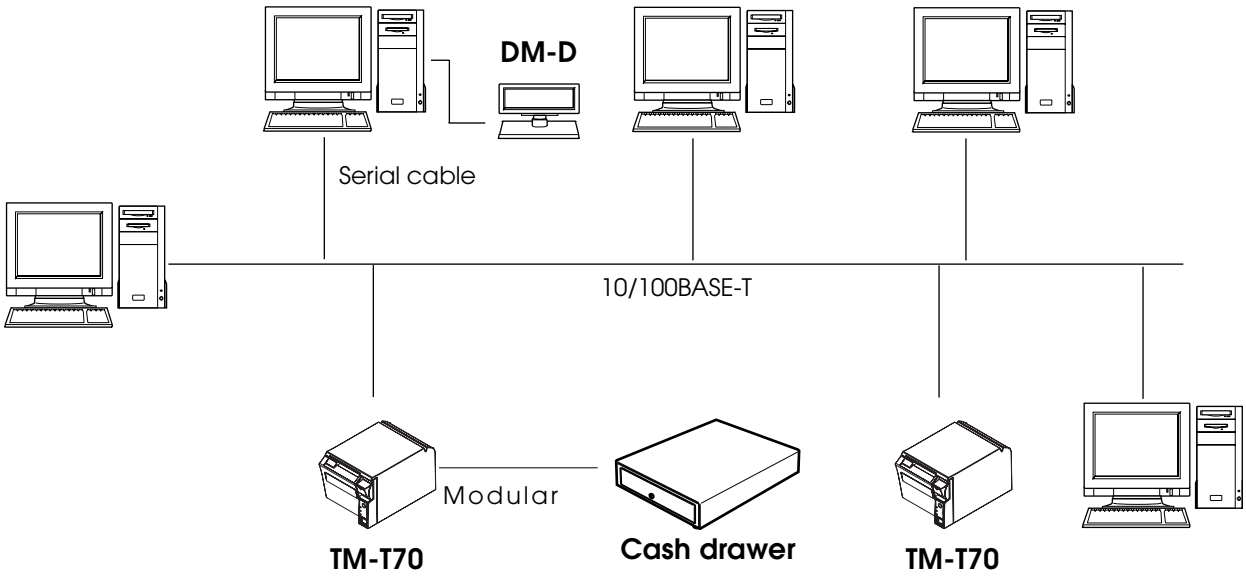


3 Connect the USB cable from the host computer to the USB upstream connector.

For LAN Interface

Connect the printer to a network by a LAN cable via a hub.

LAN interface connection diagram



CAUTION

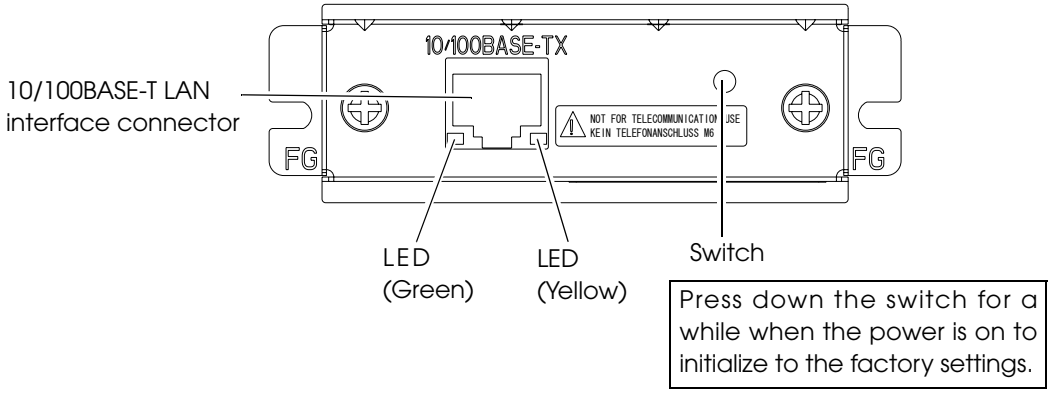
A customer display (DM-D series) cannot be connected to the printer when the printer is connected to the host computer. To connect the customer display, connect the printer to the host computer via the serial interface.

Connecting the LAN interface cable

CAUTION

- **When LAN cables are installed outdoors, make sure devices without proper surge protection are cushioned by being connected through devices that do have surge protection.**
  Otherwise, the devices can be damaged by lightning.
- **Never attempt to connect the customer display cable, drawer kick-out cable, or the standard telephone line cable to the 10/100BASE-T LAN connector.**

Connect a 10/100BASE-T cable to the 10/100BASE-T LAN connector by pressing firmly until the connector clicks into place.



NOTE

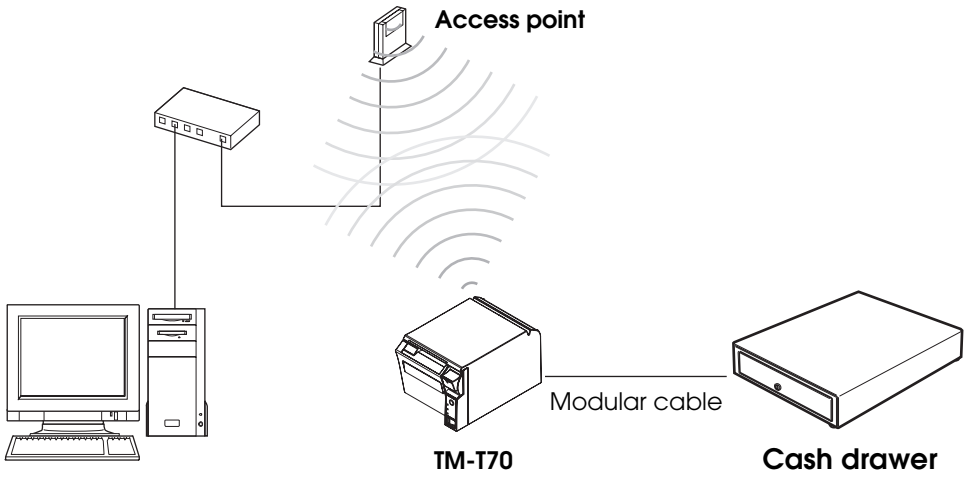
To use the LAN interface, the IP Address Setup Utility for UB-E02 is required. For detailed information about the setup methods, see the UB-E02 Technical Reference Guide. You can obtain the IP Address Setup Utility for UB-E02 and the UB-E02 Technical Reference Guide from one of the following URLs or ask your dealer:

- For customers in North America, go to the following web site:
http://www.epsonexpert.com/
- For customers in other countries, go to the following web site:
http://www.epson-pos.com/

For Wireless LAN Interface

For details on how to set up a wireless LAN interface, see the UB-R02/R03 Technical Reference Guide.

Wireless LAN interface connection diagram



NOTE

To use the wireless LAN interface, the IP Address Setup Utility for UB-R02/R03 is required. For detailed information about the setup methods, see the UB-R02/R03 Technical Reference Guide. You can obtain the IP Address Setup Utility for UB-R02/R03 and the UB-R02/R03 Technical Reference Guide from one of the following URLs or ask your dealer:

- For customers in North America, go to the following web site:

http://www.epsonexpert.com/

- For customers in other countries, go to the following web site:

http://www.epson-pos.com/

Connecting the Power Supply Unit (PS-180)

Use the PS-180 or an equivalent product as the power supply unit.

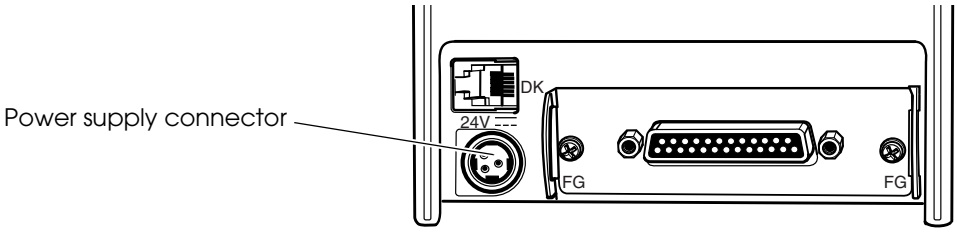
WARNING

- **Always use the EPSON PS-180 or an equivalent product as the power supply unit.** Using a nonstandard power supply can result in electric shock and fire.
- **Should a fault ever occur in the EPSON PS-180 or equivalent product, immediately turn off the power to the printer and remove the power supply cable from the wall socket.**

Connecting the Power Supply Unit

1 Make sure the printer's power supply is turned off and the power supply unit's power cable has been removed from the wall socket.

2 Insert the connector of the power supply cable onto the power supply connector (stamped **24V**).



WARNING

- **Be sure to remove the power supply unit's cable from the wall socket whenever connecting or disconnecting the power supply unit to the printer.** Failure to do so may result in damage to the power supply unit or the printer.
- **Make sure the wall socket power supply satisfies the rated voltage requirements of the power supply unit. Never insert the power supply cable plug into a socket that does not meet the rated voltage requirements of the power supply unit.** Doing so may result in damage to both the power supply and the printer.

CAUTION

Before removing the DC cable connector from the PS-180, make sure the power supply cable has been removed from the power supply unit, then grasp the arrow-marked section of the connector and pull straight out.

Connecting the Cash Drawer

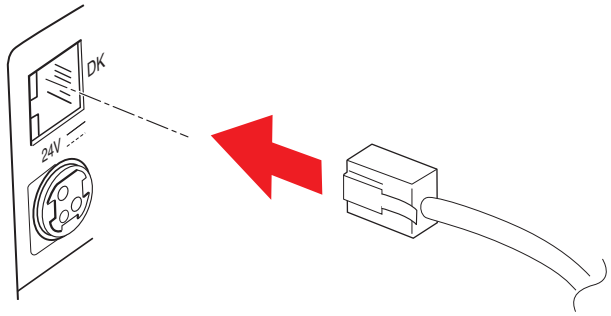
Use the cash drawer handled by EPSON or your dealer.

Connecting the Drawer Kick-out Cable

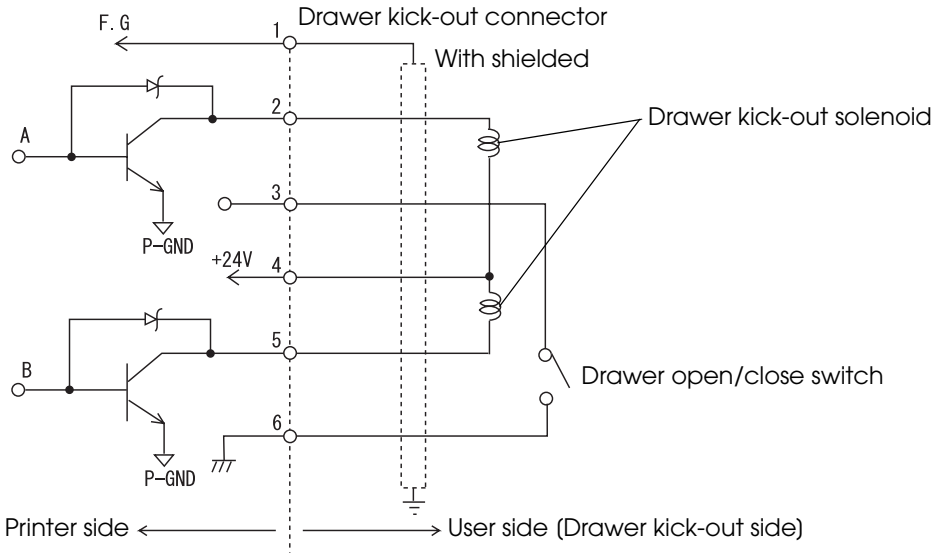
WARNING

- **Specifications of drawers differ depending on makers or models. When you use a drawer other than specified, make sure its specification meets the following conditions.**
  Otherwise, devices may be damaged.
  - The load, such as a drawer kick-out solenoid, must be connected between pins 4 and 2 or pins 4 and 5 of the drawer kick-out connector.
  - When the drawer open/close signal is used, a switch must be provided between drawer kick-out connector pins 3 and 6.
  - The resistance of the load, such as a drawer kick-out solenoid, must be 24 Ω or more or the input current must be 1A or less.
  - Be sure to use the 24V power output on drawer-kick out connector pin 4 for driving the equipment.
- **Use a shield cable for the drawer connector cable.**
- **Two driver transistors cannot be energized simultaneously.**
- **Leave intervals longer than 4 times the drawer driving pulse when sending it continuously.**
- **Be sure to use the printer power supply (connector pin 4) for the drawer power source.**
- **Do not insert a telephone line into the drawer kick-out connector.**
  Doing so may damage the telephone line or printer.

Connect the connector of the drawer kick-out cable to the printer.



Drawer Circuitry



Setting the Buzzer

Models with the buzzer function can beep the buzzer when the drawer is opened.

The buzzer setting is performed by setting the DIP switches for the buzzer and specifying connector pin numbers to which a command outputs a pulse signal.

DIP switch	Specified connector pin	ON	OFF	Initial setting
1	Drawer kick out connector pin 2	Buzzer beeps.	Buzzer does not beep.	ON
2	Drawer kick out connector pin 5	Buzzer beeps.	Buzzer does not beep.	OFF

NOTE

Since the buzzer drive signal and the cash drawer drive signal are common in the printer, do not use the same connector pin numbers to output the signal for the buzzer and the cash drawer.

NOTE

For detailed information about ESC/POS commands, see the ESC/POS Application Programing Guide.

Application Development Information

This chapter describes how to control the printer and gives information useful for printer application development.

How to Control the Printer

Use a driver or ESC/POS commands to control the printer.

Selecting a Driver

Choose one of the drivers, Advanced Printer Driver (APD) or OPOS ADK, depending on the application operating environment. You cannot control the same printer with both of the drivers. For information about the driver operating environment, see the installation manual for each driver.

When you newly develop an application

- Use APD if you want to print TrueType fonts or print much graphics.
- OPOS ADK is recommended for system extensibility. An OPOS driver is provided for various peripherals and it is now a POS industry standard. It enables efficient POS system establishment, reduction of development cost, and effective use of application assets.

When APD is used for your existing application

Use APD.

When OPOS ADK is used for your existing application

Use OPOS ADK.

NOTE

You can use all functions including ones not supported by OPOS ADK or APD by using a driver with ESC/POS commands. Use the DIRECT I/O function of OPOS ADK, the control A command of APD, or Status API to send ESC/POS commands from each driver. (See "ESC/POS command functions" on page 52.)

ESC/POS Command

ESC/POS is the Epson original printer command system. With ESC/POS commands, you can directly control all the TM printer functions, but detailed knowledge of printer specifications or combination of commands is required compared to using a driver.

To use ESC/POS commands, you need to make a nondisclosure contract first and get the ESC/POS Application Programing Guide. Ask your dealer for details.

The ESC/POS command functions are listed as follows. See the ESC/POS Application Programing Guide for more details.

ESC/POS command functions

Commands for printing
Print and line feed
Print and feed *n* lines
Print data in page mode
Print and return to standard mode (in page mode)
Commands for line spacing
Set line spacing
Select default line spacing
Commands for print character
Select character code table
Select an international character set
Set right-side character spacing
Set all print decoration
Turn underline mode on/off
Turn emphasized mode on/off
Select character font
Select character size
Turn smoothing mode on/off
Turn upside-down print mode on/off
Turn white/black reverse print mode on/off
Set character decoration

Select/cancel user-defined character set
Define user-defined characters
Cancel print data in page mode
Commands for panel buttons
Enable/disable panel buttons
Commands for paper sensors
Select paper sensor(s) to stop printing
Select paper sensor(s) to output paper-end signals
Commands for print positions
Horizontal tab
Set horizontal tab positions
Set left margin
Set print area width
Select justification
Set absolute print position
Set relative print position
Set print area in page mode
Select print direction in page mode
Set absolute vertical print position in page mode
Set relative vertical print position in page mode
Commands for bit image
Transmit the NV graphic memory capacity
Print the graphics data in the print buffer
Transmit the remaining capacity of the NV graphics memory
Transmit the key code list for defined NV graphics
Delete the specified NV graphics data
Define the NV graphics data
Print the specified NV graphics data
Store the graphics data in the print buffer
Select bit-image mode

Define downloaded bit image
Print downloaded bit image
Commands for status
Enable/disable Automatic Status Back (ASB)
Transmit status
Transmit real-time status
Commands for barcode
Print barcode
Set barcode height
Set barcode width
Select print position of HRI characters
Select font for HRI characters
Commands for two-dimensional code
PDF417: Set the number of columns in the data region
PDF417: Set the number of rows
PDF417: Set the width of module
PDF417: Set the row height
PDF417: Set the error correction level
PDF417: Select the options
PDF417: Store the data in the symbol storage area
PDF417: Print the symbol data in the symbol storage area
PDF417: Transmit the size information of the symbol data in the symbol storage area
QR Code: Select the model
QR Code: Set the size of module
QR Code: Select the error correction level
QR Code: Store the data in the symbol storage area
QR Code: Print the symbol data in the symbol storage data area
QR Code: Transmit the size information of the symbol data in the symbol storage area
Commands for mechanical control
Select cut mode and cut paper

Commands for customization
Set the customized setting values
Transmit the customized setting values
Set the configuration item for the serial interface
Transmit the configuration item for the serial interface
Delete the specified record of NV user memory
Store the data in the specified record of NV user memory
Transmit the data in the specified record of NV user memory
Transmit capacity of the NV user memory currently being used
Transmit the remaining capacity of the NV user memory
Transmit the key code list
Delete all data in the NV user memory
Commands for sub-functions
Initialize printer
Transmit printer ID
Set horizontal and vertical motion units
Select peripheral device
Generate pulse to drawer
Generate pulse to drawer in real-time
Execute power-off sequence
Clear buffer(s)
Enable/disable real-time command
Send real-time request to printer
Select page mode
Select standard mode
Set the process ID response
Execute test print
Select the print speed
Select the number of parts for the thermal head energizing
Initialize maintenance counter
Transmit maintenance counter

Software and Manuals

The following software and manuals are provided for application development.

Software	Description	Manual
Drivers		
EPSON Advanced Printer Driver (APD)	In addition to ordinary Windows driver functions, this driver has controls specific to POS such as controls of paper cut, a cash drawer, or customer display. The Status API (Epson original DLL) that monitors printer status and sends ESC/POS command is also attached to this driver.	• APD installation manual • APD TM driver manual • APD Printer driver specification • Status API Reference manual
OPOS ADK (OPOS)	This OCX driver can control POS peripherals using OLE technology*1. Because controlling POS peripherals with original commands is not required on the application side, efficient system development is possible.	• OPOS installation manual • User's guide • Application development guide • OPOS Application Programing Guide*2 • Sample program guide • TM Flash Logo Utility user's manual
Utilities for developers		
TM Flash LOGO Setup Utility for NVRAM (TM-FLOGO)	Use to register data such as shop logos in the NV memory of the printer.	—
Memory Switch Setting Utility	use to change the memory switch and customized value.	User's manual
TMUSB Identifier Utility	Use to edit USB identifying code for the USB interface.	—
TM Net WinConfig utility for UB-E02	Use to setup IP address for the LAB interface.	UB-E02 Technical Reference Guide
TM Net WinConfig utility for UB-R02/R03	Use to setup IP address for the wireless interface.	UB-R02/R03 Technical Reference Guide

*1: OLE technology developed by Microsoft divides software into part blocks. The OPOS driver is supposed to be used with a develop environment such as Visual Basic, unlike ordinary Windows drivers. It is not a driver to be used for printing from commercial applications.

*2: Describes not Epson's specific functions, but general information on how to control printers using OPOS ADK (in the chapter "POS Printer").

Other than listed in the previous page, the UB-E02 Technical Reference Guide is provided to develop applications for the LAN interface.

Download

Drivers, utilities, and manuals can be downloaded from one of the following URLs.

For customers in North America, go to the following web site:

http://www.epsonexpert.com/ and follow the on-screen instructions.

For customers in other countries, go to the following web site:

http://www.epson-pos.com/

Setting Check Modes

Besides the ordinary print mode, the printer has a self-test mode and hexadecimal dumping mode to check settings of the printer.

Self-test Mode

You can confirm the following printer functions by running the self-test.

- Control circuit functions
- Printer mechanism
- Print quality
- ROM version
- DIP switch settings

Starting Self-test

Follow the steps below to run the self-test.

1 Close the roll paper cover.

2 While pressing the FEED button, turn on the printer. (Keep pressing the FEED button until the printer starts printing.)

The printer prints current status of the printer on the roll paper.

> **NOTE** With the LAN interface, before printing starts, it takes 6 seconds if the IP address is fixed and 13 seconds if the IP address is obtained with the automatic setting. (It may takes longer depending on the response time from a host.)

When the printer finishes printing the printer status, the following message is printed and the PAPER OUT LED flashes. (The printer is now in the self-test wait mode.):

"If you want to continue SELF-TEST printing. Please press FEED button."

3 To begin the print test again, press the FEED button while the printer is in the self-test wait mode.

4 After printing the following message, the printer is initialized and returned to the normal mode.

"*** completed ***"

Hexadecimal Dumping Mode

In the hexadecimal dumping mode, the printer prints the data transmitted from a host computer in hexadecimal numbers and their corresponding characters.

Starting hexadecimal dumping

Follow the steps below to perform the hexadecimal dumping.

CAUTION

- If there is no character corresponding to print data, "." is printed.
- If print data is less than one line, press the FEED button to print the line.
- Applications that confirm printer status may not work correctly during the hexadecimal dumping mode. The printer returns only the status for "Transmit real-time status."

1. Open the roll paper cover.
2. While pressing the FEED button, turn on the printer.
3. Close the roll paper cover.

   Data received from then on is printed out from the printer in hexadecimal numbers and their corresponding characters.

4. To quit the hexadecimal dumping mode, turn off the printer or press the FEED button three times.

Printing example

```
Hexadecimal Dump
To terminate hexadecimal dump,
press FEED button three times.



1B 21 00 1B 26 02 40 40 1B 69  .  !  .  .  &  .  @  @  .  i
1B 25 01 1B 63 34 00 1B 30 31  .  %  .  .  c  4  .  .  0  1
41 42 43 44 45 46 47 48 49 4A  A  B  C  D  E  F  G  H  I  J

                  ***  completed  ***
```

Handling

This chapter describes basic handling of the printer.

Installing and Replacing Roll Paper

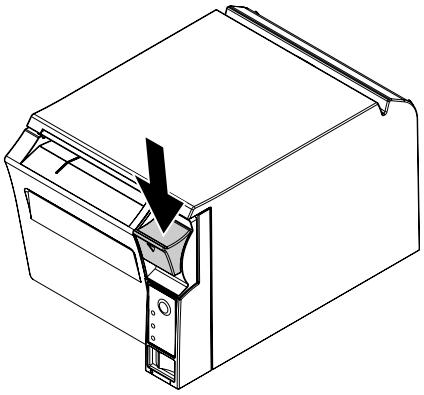
WARNING

- **Do not open the roll paper cover during printing.**
  The printer may be damaged.
- **Do not touch the manual cutter with your hands when installing or replacing the roll paper.**
  Otherwise, you may be injured because the manual cutter blade is sharp.

CAUTION

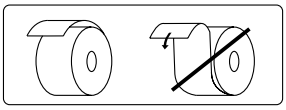
- Use roll paper that meets the printer specification. For details about paper specification, see "Paper Specifications" on page 24.
- Paper must not be pasted to the roll paper spool.

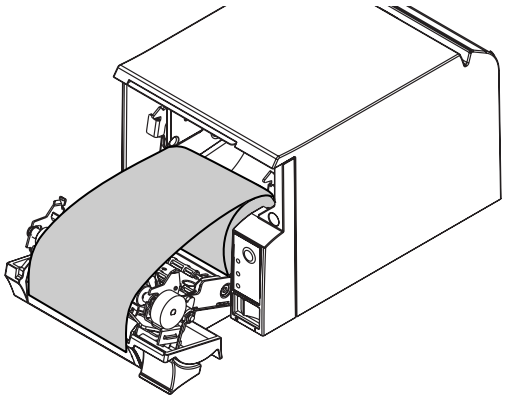
1 Press the cover open lever to open the roll paper cover.



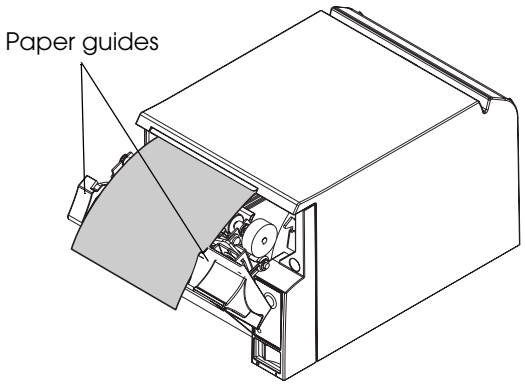
2 Remove the used roll paper core, if any.

3 In the correct direction of the roll paper, install the roll paper.

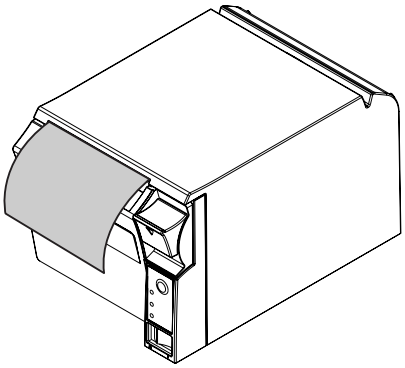




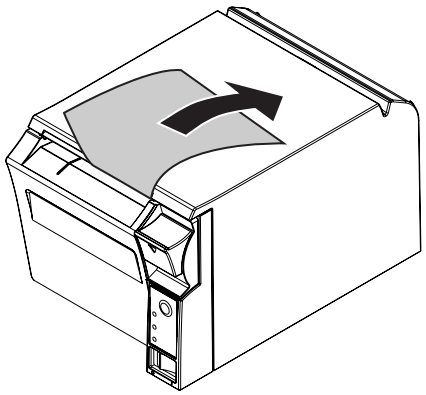
4 Pull out some roll paper, and make sure that the roll paper is set between the paper guides.



5 Close the roll paper cover.



6 Tear off the roll paper.



Removing Jammed Paper

> **CAUTION**
>
> **Do not touch the thermal head (See"Cleaning the Thermal Head" on page 63.) because it can be very hot after printing.**

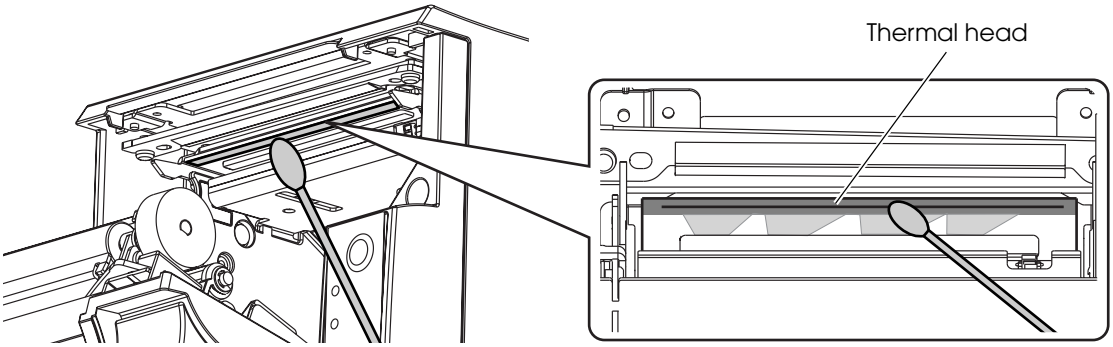
1. Turn off the printer and press the cover open lever to open the roll paper cover.
2. Remove the jammed paper, reinstall the roll, and close the roll paper cover.

Cleaning the Thermal Head

Epson recommends cleaning the thermal head periodically (generally every 3 months) to maintain receipt print quality.

> **CAUTION**
>
> **After printing, the thermal head can be very hot. Do not touch it and let it cool before you clean it. Do not damage the thermal head by touching it with your fingers or any hard object.**

Turn off the printer and open the printer cover. Clean the thermal elements of the thermal head with a cotton swab moistened with an alcohol solvent (ethanol or IPA).



Preparing for Transport

Follow the steps below to transport the printer.

1. Turn off the printer.
2. Confirm that ⏻ LED is off.
3. Remove the power supply connector.
4. Remove the roll paper.
5. Pack the printer upright.

Appendix

Specifications of Interface and Connector

NOTE

For detailed information about LAN or wireless LAN, see one of the following:

- LAN: UB-E02 Technical Reference Guide
- Wireless LAN: UB-R02/R03 Technical Reference Guide

RS-232C Serial Interface

Interface board specifications (RS-232C-compliant)

Item		Specifications
Data transfer method		Serial
Synchronization		Asynchronous
Handshake		Select one of the following with DIP switch 1-3: • DTR/DSR • XON/XOFF
Signal level	MARK	-3V to -15V logic "1"/OFF
	SPACE	+3V to +15V logic "0"/ON
Bit length		Select one of the following with DIP switch 1-4: • 7 bit • 8 bit
Transmission speed (bps: bits per second)		• Select one of the following with DIP switch 1-7/1-8: 4800/9600/19200/115200 bps • Select one of the following with commands: 2400/4800/9600/19200/38400/57600/115200 bps
Parity check		Select one of the following with DIP switch 1-5: • Yes • No
Parity selection		Select one of the following with DIP switch 1-6: • Even • Odd
Stop bit		1 or more bits However, the stop bit for data transfer from the printer is fixed to 1 bit.
Connector	Printer side	DSUB 25-pin (female) connector

Functions of each connector pin

Pin no.	Signal name	Signal direction	Function
1	FG	—	Frame ground
2	TXD	Output	Transmission data
3	RXD	Input	Reception data
4	RTS	Output	Equivalent to DTR signal (pin 20)
6	DSR	Input	This signal indicates whether the host computer can receive data. SPACE indicates that the host computer can receive data. MARK indicates that the host computer cannot receive data. When DTR/DSR control is selected, the printer transmits data after confirming this signal (except if transmitted using some ESC/POS commands). When XON/XOFF control is selected, the printer does not check this signal. Changing DIP switch 2-7 lets this signal be used as a printer reset signal. When you use this signal as the printer's reset signal, the printer is reset when the signal remains MARK for a pulse width of 1 ms or more.
7	SG	—	Signal ground
20	DTR	Output	1) When DTR/DSR control is selected, this signal indicates whether the printer is BUSY. • SPACE status Indicates that the printer is ready to receive data. • MARK status Indicates that the printer is BUSY. Set BUSY conditions with DIP switch 2-1. 2) When XON/XOFF control is selected, the signal indicates that the printer is properly connected and ready to receive data from the host. The signal is always SPACE, except in the following cases: • During the period from when power is turned on to when the printer is ready to receive data. • During the self-test.
25	INT	Input	Changing DIP switch 2-8 enables this signal to be used as a reset signal for the printer. The printer is reset if the signal remains at SPACE for a pulse width of 1 ms or more.

XON/XOFF

When XON/XOFF control is selected, the printer transmits the XON or XOFF signals as follows. The transmission timing of XON/XOFF differs, depending on the setting of DIP switch 2-1.

Signal	Printer status	DIP switch 2-1	
		1 (ON)	0 (OFF)
XON	1) When the printer goes online after turning on the power (or reset using the interface)	Transmit	Transmit
	2) When the receive buffer is released from the buffer full state	Transmit	Transmit
	3) When the printer switches from offline to online	—	Transmit
	4) When the printer recovers from an error using some ESC/POS commands	—	Transmit
XOFF	5) When the receive buffer becomes full	Transmit	Transmit
	6) When the printer switches from online to offline	—	Transmit

Code

The hexadecimal numbers corresponding to the XON/XOFF codes are shown below.

- XON code: 11H
- XOFF code: 13H

CAUTION

- When the printer goes from offline to online and the receive buffer is full, XON is not transmitted.
- When the printer goes from online to offline and the receive buffer is full, XOFF is not transmitted.
- When DIP switch 1-3 is off, XON is not transmitted as long as the printer is offline, even if a receive buffer full state has been cleared.

Modes

The IEEE 1284 parallel interface supports the following two modes.

Mode	Communication direction	Other information
Compatibility mode	Host → Printer communication	Centronics-compliant
Reverse mode	Printer → Host communication	Assumes a data transfer from an asynchronous printer

Compatibility Mode

Compatibility mode allows data transmission from host to printer only: Centronics-compatible.

Specification

Data transmission	8-bit parallel
Synchronization	Externally supplied $\overline{\text{STROBE}}$ signals
Handshaking	$\overline{\text{ACK}}$ and BUSY signals
Signal levels	TTL-compatible connector
Connector	ADS-B36BLFDR176 (HONDA) or equivalent product
Reverse communication	Nibble or byte mode

Reverse Mode

The transfer of status data from the printer to the host proceeds in the nibble or byte mode.

This mode allows data transfer from an asynchronous printer under the control of the host. Data transfers in the nibble mode are made via the existing control lines in units of four bits (a nibble). In the byte mode, data transfer proceeds by making the 8-bit data lines bidirectional. Both modes fail to proceed concurrently in the compatibility mode, thereby causing half-duplex transmission.

Interface signals

Pin	Source	Compatibility Mode	Nibble Mode	Byte Mode
1	Host	Strobe	HostClk	HostClk
2	Host/Ptr	Data0 (LSB)	Data0 (LSB)	Data0 (LSB)
3	Host/Ptr	Data1	Data1	Data1
4	Host/Ptr	Data2	Data2	Data2
5	Host/Ptr	Data3	Data3	Data3
6	Host/Ptr	Data4	Data4	Data4
7	Host/Ptr	Data5	Data5	Data5
8	Host/Ptr	Data6	Data6	Data6
9	Host/Ptr	Data7 (MSB)	Data7 (MSB)	Data7 (MSB)
10	Printer	$\overline{\text{Ack}}$	PtrClk	PtrClk
11	Printer	Busy	PtrBusy/Data3,7	PtrBusy
12	Printer	Perror	AckDataReq/Data2,6	AckDataReq
13	Printer	Select	Xflag/Data1,5	Xflag
14	Host	$\overline{\text{AutoFd}}$	HostBusy k	HostBusy
15		NC	ND	ND
16		GND	GND	GND
17		FG	FG	FG
18	Printer	Logic-H	Logic-H	Logic-H
19		GND	GND	GND
20		GND	GND	GND
21		GND	GND	GND
22		GND	GND	GND
23		GND	GND	GND
24		GND	GND	GND
25		GND	GND	GND
26		GND	GND	GND
27		GND	GND	GND

Pin	Source	Compatibility Mode	Nibble Mode	Byte Mode
28		GND	GND	GND
29		GND	GND	GND
30		GND	GND	GND
31	Host	$\overline{\text{Init}}$	$\overline{\text{Init}}$	$\overline{\text{Init}}$
32	Printer	$\overline{\text{Fault}}$	$\overline{\text{DataAvail/Data0,4}}$	$\overline{\text{DataAvail}}$
33		GND	ND	ND
34	Printer	DK_STATUS	ND	ND
35	Printer	+5V	ND	ND
36	Host	$\overline{\text{SelectIn}}$	1284-Active	1284-Active

NC: None Connect

ND: Not Defined

CAUTION

- A signal name with a rule above it indicates an “L” active signal.
- Bidirectional communications cannot take place, unless all signal names for both sides correspond to each other.
- Connect all signal lines using a twisted-pair cable. Connect the return side to the signal ground level.
- Make sure the signals satisfy electrical characteristics.
- Set the leading edge and trailing edge times to 0.5ms or less.
- Do not ignore $\overline{\text{Ack}}$ or BUSY signals during a data transfer. Ignoring such signals may result in data corruption.
- Make the interface cables as short as possible.

USB (Universal Serial Bus) Interface

Outline

- Full-speed transmission at 12Mbps [bps: bits per second]
- Plug & Play, Hot Insertion & Removable

USB transmission specifications

USB function

Overall specifications	According to USB 2.0 specifications
Transmission speed	USB Full-Speed (12 Mbps)
Transmission method	USB bulk transmission method
Power supply specifications	USB self power supply function
Current consumed by USB bus	0 mA
USB packet size (with full-speed connection)	
USB bulk OUT (TM)	64 bytes
USB bulk IN (TM)	64 bytes

Status transmission from printer with USB interface

In order to ensure that there is no lack of status data, it is necessary to periodically retrieve status data at the host computer.

Unlike RS232C transmission, it cannot spontaneously interrupt data transmission to the host computer.

The printer has a 128-byte status data buffer. Statuses that exceed the buffer capacity are cancelled.

Character Code Tables

CAUTION

- The character code tables show only character configurations. They do not show the actual print pattern.
- “SP” in the table shows a space.

Common to All Pages

When International character set (See "International Character Sets" on page 84.) is USA:

HEX	0	1	2	3	4	5	6	7
0	NUL 00	DLE 16	SP 32	0 48	@ 64	P 80	` 96	p 112
1	01	XON 17	! 33	1 49	A 65	Q 81	a 97	q 113
2	02	18	" 34	2 50	B 66	R 82	b 98	r 114
3	03	XOFF 19	# 35	3 51	C 67	S 83	c 99	s 115
4	EOT 04	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116
5	ENQ 05	NAK 21	% 37	5 53	E 69	U 85	e 101	u 117
6	ACK 06	22	& 38	6 54	F 70	V 86	f 102	v 118
7	07	23	' 39	7 55	G 71	W 87	g 103	w 119
8	08	CAN 24	(40	8 56	H 72	X 88	h 104	x 120
9	HT 09	25	) 41	9 57	I 73	Y 89	i 105	y 121
A	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122
B	11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123
C	FF 12	FS 28	, 44	< 60	L 76	¥ 92	l 108	| 124
D	CR 13	GS 29	- 45	= 61	M 77	] 93	m 109	} 125
E	14	RS 30	. 46	> 62	N 78	^ 94	n 110	~ 126
F	15	31	/ 47	? 63	O 79	_ 95	o 111	SP 127

Page 0 (PC437: USA, Standard Europe)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	ü 129	æ 145	í 161	▒ 177	┴ 193	╤ 209	β 225	± 241
2	é 130	Æ 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	ï 139	¢ 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251
C	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252
D	ì 141	¥ 157	¡ 173	╜ 189	═ 205	▌ 221	Φ 237	² 253
E	Ä 142	Pt 158	« 174	╛ 190	╬ 206	▐ 222	ε 238	■ 254
F	Å 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255

Page 1 (Katakana)

HEX	8	9	A	B	C	D	E	F
0	_ 128	丄 144	SP 160	− 176	タ 192	ミ 208	═ 224	╳ 240
1	▬ 129	丅 145	。 161	ア 177	チ 193	ム 209	╞ 225	円 241
2	▬ 130	┤ 146	「 162	イ 178	ツ 194	メ 210	╪ 226	年 242
3	▬ 131	├ 147	」 163	ウ 179	テ 195	モ 211	╡ 227	月 243
4	■ 132	￣ 148	、 164	エ 180	ト 196	ヤ 212	◢ 228	日 244
5	■ 133	ー 149	・ 165	オ 181	ナ 197	ユ 213	◣ 229	時 245
6	■ 134	│ 150	ヲ 166	カ 182	ニ 198	ヨ 214	◥ 230	分 246
7	■ 135	┃ 151	ァ 167	キ 183	ヌ 199	ラ 215	◤ 231	秒 247
8	▏ 136	「 152	ィ 168	ク 184	ネ 200	リ 216	♠ 232	干 248
9	▎ 137	┐ 153	ゥ 169	ケ 185	ノ 201	ル 217	♥ 233	市 249
A	▍ 138	└ 154	ェ 170	コ 186	ハ 202	レ 218	♦ 234	区 250
B	▌ 139	┘ 155	ォ 171	サ 187	ヒ 203	ロ 219	♣ 235	町 251
C	▋ 140	┌ 156	ャ 172	シ 188	フ 204	ワ 220	● 236	村 252
D	▊ 141	┐ 157	ュ 173	ス 189	ヘ 205	ン 221	○ 237	人 253
E	▉ 142	└ 158	ョ 174	セ 190	ホ 206	゛ 222	／ 238	▒ 254
F	┼ 143	┘ 159	ッ 175	ソ 191	マ 207	゜ 223	＼ 239	SP 255

Page 2 (PC850: Multilingual)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	▒ 176	└ 192	ð 208	Ó 224	- 240
1	ü 129	æ 145	í 161	▒ 177	┴ 193	Đ 209	β 225	± 241
2	é 130	Æ 146	ó 162	▓ 178	┬ 194	Ê 210	Ô 226	‗ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ò 227	¾ 243
4	ä 132	ö 148	ñ 164	┤ 180	─ 196	È 212	õ 228	¶ 244
5	à 133	ò 149	Ñ 165	Á 181	┼ 197	ı 213	Õ 229	§ 245
6	å 134	û 150	ª 166	Â 182	ã 198	Í 214	µ 230	÷ 246
7	ç 135	ù 151	º 167	À 183	Ã 199	Î 215	þ 231	¸ 247
8	ê 136	ÿ 152	¿ 168	© 184	╚ 200	Ï 216	Þ 232	° 248
9	ë 137	Ö 153	® 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249
A	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250
B	ï 139	ø 155	½ 171	╗ 187	╦ 203	█ 219	Ù 235	¹ 251
C	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	ý 236	³ 252
D	ì 141	Ø 157	¡ 173	¢ 189	═ 205	¦ 221	Ý 237	² 253
E	Ä 142	× 158	« 174	¥ 190	╬ 206	Ì 222	¯ 238	■ 254
F	Å 143	ƒ 159	» 175	┐ 191	¤ 207	▀ 223	´ 239	SP 255

Page 3 (PC860: Portuguese)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	ü 129	À 145	í 161	▒ 177	┴ 193	╤ 209	β 225	± 241
2	é 130	È 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	ã 132	õ 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	Á 134	Ú 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	ê 136	Ì 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	Ê 137	Õ 153	Ò 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	Í 139	¢ 155	½ 171	╗ 187	╦ 203	▉ 219	δ 235	√ 251
C	Ô 140	£ 156	¼ 172	╝ 188	╠ 204	■ 220	∞ 236	n 252
D	ì 141	Ù 157	¡ 173	╜ 189	═ 205	▌ 221	Φ 237	² 253
E	Ã 142	Pt 158	« 174	╛ 190	╬ 206	▐ 222	ε 238	■ 254
F	Â 143	Ó 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255

Page 4 (PC863: Canadian-French)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	¦ 160	░ 176	└ 192	╨ 208	α 224	≡ 240
1	ü 129	È 145	´ 161	▒ 177	┴ 193	╤ 209	β 225	± 241
2	é 130	Ê 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	Â 132	Ë 148	¨ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	à 133	Ï 149	¸ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	¶ 134	û 150	³ 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	ç 135	ù 151	¯ 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	ê 136	¤ 152	Î 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	ë 137	Ô 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	ï 139	¢ 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251
C	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	ⁿ 252
D	‗ 141	Ù 157	¾ 173	╜ 189	═ 205	▌ 221	Φ 237	² 253
E	À 142	Û 158	« 174	╛ 190	╬ 206	▐ 222	ε 238	■ 254
F	§ 143	ƒ 159	» 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255

Page 5 (PC865: Nordic)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240
1	ü 129	æ 145	í 161	▒ 177	┴ 193	╤ 209	β 225	± 241
2	é 130	Æ 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243
4	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244
5	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245
6	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246
7	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247
8	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248
9	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249
A	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250
B	ï 139	ø 155	½ 171	╗ 187	╦ 203	▉ 219	δ 235	√ 251
C	î 140	£ 156	¼ 172	╝ 188	╠ 204	■ 220	∞ 236	n 252
D	ì 141	Ø 157	¡ 173	╜ 189	═ 205	▌ 221	Φ 237	² 253
E	Ä 142	Pt 158	« 174	╛ 190	╬ 206	▐ 222	ε 238	■ 254
F	Å 143	*f* 159	¤ 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255

Page 16 (WPC1252)

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	À 192	Đ 208	à 224	ð 240
1	SP 129	‘ 145	¡ 161	± 177	Á 193	Ñ 209	á 225	ñ 241
2	‚ 130	’ 146	¢ 162	² 178	Â 194	Ò 210	â 226	ò 242
3	ƒ 131	“ 147	£ 163	³ 179	Ã 195	Ó 211	ã 227	ó 243
4	„ 132	” 148	¤ 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
5	… 133	• 149	¥ 165	µ 181	Å 197	Õ 213	å 229	õ 245
6	† 134	– 150	¦ 166	¶ 182	Æ 198	Ö 214	æ 230	ö 246
7	‡ 135	— 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
8	ˆ 136	˜ 152	¨ 168	¸ 184	È 200	Ø 216	è 232	ø 248
9	‰ 137	™ 153	© 169	¹ 185	É 201	Ù 217	é 233	ù 249
A	Š 138	š 154	ª 170	º 186	Ê 202	Ú 218	ê 234	ú 250
B	‹ 139	› 155	« 171	» 187	Ë 203	Û 219	ë 235	û 251
C	Œ 140	œ 156	¬ 172	¼ 188	Ì 204	Ü 220	ì 236	ü 252
D	SP 141	SP 157	- 173	½ 189	Í 205	Ý 221	í 237	ý 253
E	Ž 142	ž 158	® 174	¾ 190	Î 206	Þ 222	î 238	þ 254
F	SP 143	Ÿ 159	¯ 175	¿ 191	Ï 207	ß 223	ï 239	ÿ 255

Page 17 (PC866: Cyrillic #2)

HEX	8	9	A	B	C	D	E	F
0	А 128	Р 144	а 160	▒ 176	└ 192	╨ 208	р 224	Ё 240
1	Б 129	С 145	б 161	▒ 177	┴ 193	╤ 209	с 225	ё 241
2	В 130	Т 146	в 162	▓ 178	┬ 194	╥ 210	т 226	Є 242
3	Г 131	У 147	г 163	│ 179	├ 195	╙ 211	у 227	є 243
4	Д 132	Ф 148	д 164	┤ 180	─ 196	╘ 212	ф 228	Ї 244
5	Е 133	Х 149	е 165	╡ 181	┼ 197	╒ 213	х 229	ї 245
6	Ж 134	Ц 150	ж 166	╢ 182	╞ 198	╓ 214	ц 230	Ў 246
7	З 135	Ч 151	з 167	╖ 183	╟ 199	╫ 215	ч 231	ў 247
8	И 136	Ш 152	и 168	╕ 184	╚ 200	╪ 216	ш 232	° 248
9	Й 137	Щ 153	й 169	╣ 185	╔ 201	┘ 217	щ 233	• 249
A	К 138	Ъ 154	к 170	║ 186	╩ 202	┌ 218	ъ 234	· 250
B	Л 139	Ы 155	л 171	╗ 187	╦ 203	█ 219	ы 235	√ 251
C	М 140	Ь 156	м 172	╝ 188	╠ 204	▄ 220	ь 236	№ 252
D	Н 141	Э 157	н 173	╜ 189	═ 205	▌ 221	э 237	¤ 253
E	О 142	Ю 158	о 174	╛ 190	╬ 206	▐ 222	ю 238	■ 254
F	П 143	Я 159	п 175	┐ 191	╧ 207	▀ 223	я 239	SP 255

Page 18 (PC852: Latin2)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	▒ 176	└ 192	đ 208	Ó 224	- 240
1	ü 129	Ĺ 145	í 161	▒ 177	┴ 193	Đ 209	β 225	˝ 241
2	é 130	Í 146	ó 162	▓ 178	┬ 194	Ď 210	Ô 226	˛ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ń 227	ˇ 243
4	ä 132	ö 148	Ą 164	┤ 180	─ 196	ď 212	ń 228	˘ 244
5	ů 133	Ľ 149	ą 165	Á 181	┼ 197	Ň 213	ň 229	§ 245
6	ć 134	ľ 150	Ž 166	Â 182	Ă 198	Í 214	Š 230	÷ 246
7	ç 135	Ś 151	ž 167	Ě 183	ă 199	Î 215	š 231	¸ 247
8	ł 136	ś 152	Ę 168	Ş 184	╚ 200	ě 216	Ŕ 232	° 248
9	ë 137	Ö 153	ę 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249
A	Ő 138	Ü 154	SP 170	║ 186	╩ 202	┌ 218	ŕ 234	• 250
B	ő 139	Ť 155	ź 171	╗ 187	╦ 203	█ 219	Ű 235	ű 251
C	î 140	ť 156	Č 172	╝ 188	╠ 204	■ 220	ý 236	Ř 252
D	Ź 141	Ł 157	ş 173	Ż 189	═ 205	Ţ 221	Ý 237	ř 253
E	Ä 142	× 158	« 174	ż 190	╬ 206	Ů 222	ţ 238	■ 254
F	Ć 143	č 159	» 175	┐ 191	¤ 207	▀ 223	´ 239	SP 255

Page 19 (PC858: Euro)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	░ 176	└ 192	ð 208	Ó 224	- 240
1	ü 129	æ 145	í 161	▒ 177	┴ 193	Đ 209	β 225	± 241
2	é 130	Æ 146	ó 162	▓ 178	┬ 194	Ê 210	Ô 226	‗ 242
3	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ò 227	¾ 243
4	ä 132	ö 148	ñ 164	┤ 180	─ 196	È 212	õ 228	¶ 244
5	à 133	ò 149	Ñ 165	Á 181	┼ 197	€ 213	Õ 229	§ 245
6	å 134	û 150	ª 166	Â 182	ã 198	Í 214	µ 230	÷ 246
7	ç 135	ù 151	º 167	À 183	Ã 199	Î 215	þ 231	¸ 247
8	ê 136	ÿ 152	¿ 168	© 184	╚ 200	Ï 216	Þ 232	° 248
9	ë 137	Ö 153	® 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249
A	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250
B	ï 139	ø 155	½ 171	╗ 187	╦ 203	█ 219	Ù 235	¹ 251
C	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	ý 236	³ 252
D	ì 141	Ø 157	¡ 173	¢ 189	═ 205	¦ 221	Ý 237	² 253
E	Ä 142	× 158	« 174	¥ 190	╬ 206	Ì 222	¯ 238	■ 254
F	Å 143	ƒ 159	» 175	┐ 191	¤ 207	▀ 223	´ 239	SP 255

Page 255 (User-Defined Page)

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	SP 160	SP 176	SP 192	SP 208	SP 224	SP 240
1	SP 129	SP 145	SP 161	SP 177	SP 193	SP 209	SP 225	SP 241
2	SP 130	SP 146	SP 162	SP 178	SP 194	SP 210	SP 226	SP 242
3	SP 131	SP 147	SP 163	SP 179	SP 195	SP 211	SP 227	SP 243
4	SP 132	SP 148	SP 164	SP 180	SP 196	SP 212	SP 228	SP 244
5	SP 133	SP 149	SP 165	SP 181	SP 197	SP 213	SP 229	SP 245
6	SP 134	SP 150	SP 166	SP 182	SP 198	SP 214	SP 230	SP 246
7	SP 135	SP 151	SP 167	SP 183	SP 199	SP 215	SP 231	SP 247
8	SP 136	SP 152	SP 168	SP 184	SP 200	SP 216	SP 232	SP 248
9	SP 137	SP 153	SP 169	SP 185	SP 201	SP 217	SP 233	SP 249
A	SP 138	SP 154	SP 170	SP 186	SP 202	SP 218	SP 234	SP 250
B	SP 139	SP 155	SP 171	SP 187	SP 203	SP 219	SP 235	SP 251
C	SP 140	SP 156	SP 172	SP 188	SP 204	SP 220	SP 236	SP 252
D	SP 141	SP 157	SP 173	SP 189	SP 205	SP 221	SP 237	SP 253
E	SP 142	SP 158	SP 174	SP 190	SP 206	SP 222	SP 238	SP 254
F	SP 143	SP 159	SP 175	SP 191	SP 207	SP 223	SP 239	SP 255

International Character Sets

Country	ASCII code (Hex)											
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
USA	#	$	@	[	\	]	^	`	{	|	}	~
France	#	$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	β
U.K.	£	$	@	[	\	]	^	`	{	|	}	~
Denmark I	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
Spain I	Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
Japan	#	$	@	[	¥	]	^	`	{	|	}	~
Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Denmark II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Spain II	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
Latin America	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú
Korea	#	$	@	[	₩	]	^	`	{	|	}	~
Slovenia/Croatia	#	$	Ž	Š	Đ	Ć	Č	ž	š	đ	ć	č
China	#	¥	@	[	\	]	^	`	{	|	}	~